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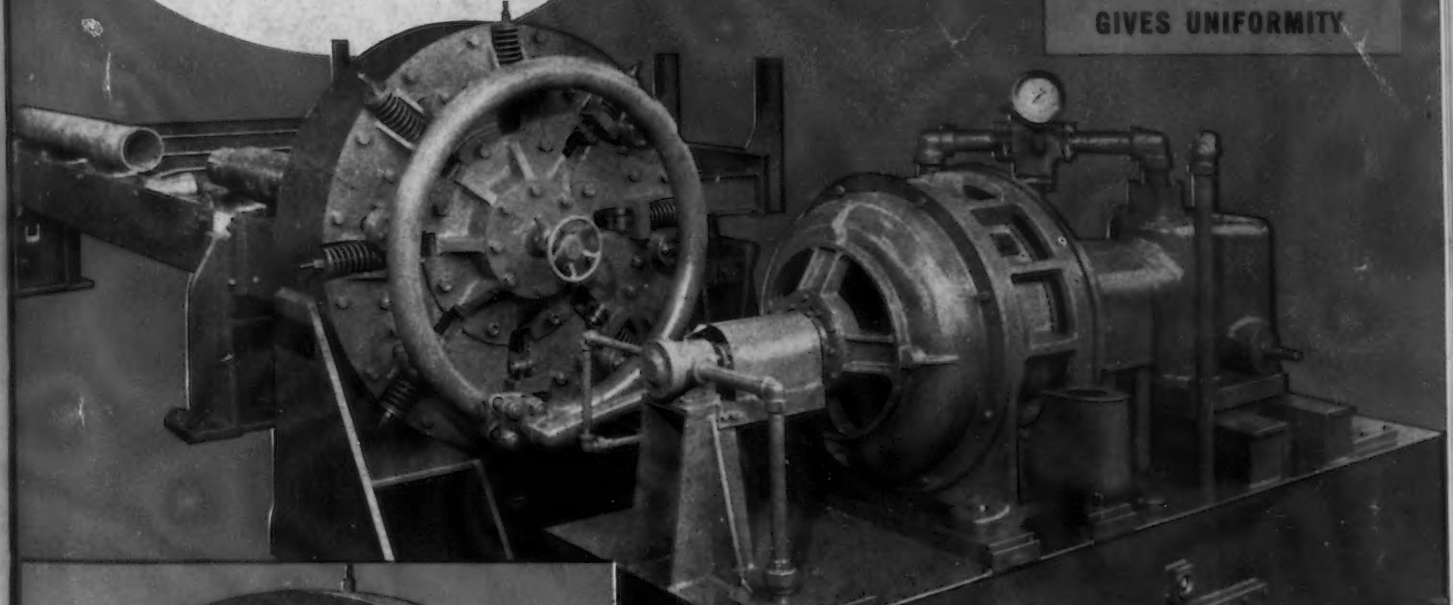

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RYERSON STEEL-SERVICE

THE IRON AGE

APRIL 22, 1943

ESTABLISHED 1855

Coordination

COORDINATION. We hear a great deal about that today in connection with our war effort.

According to our old friend Mr. Webster, to coordinate means to regulate and bring into harmonious action. Something this, that is very necessary in carrying out a war program.

A war program is *not* coordinated when you have a big army but not enough guns, tanks, shoes, tents, mess kits or "corned Willie" to match it. Nor is it coordinated when the reverse is true and you have more material than you have men.

Thanks to the efficient action of our selective service of the army and the volunteer recruiting policy of our navy, plus the magnificent job that American industry has done and is doing, men and materiel are matched today to meet almost any war demands that could be conceivably made upon them.

But that is not enough. It would be if we were fighting a war here on the American continent but we are not doing that. We have to take these men and their matching materiel anywhere from three to twelve thousand miles before either can be made effective.

Our war program, in fighting on the enemy's battle fronts, can not be considered as coordinated until transportation matches both men and materiel.

I do not know how many of our troops have been transported abroad to the four quarters of the globe since Pearl Harbor and if I did know I would not reveal the information, but from the published releases from various Washington bureaus, I am led to believe that the total number thus transported in the past fourteen months is not much in excess of two million. And if I remember correctly, during the first twelve months of our participation in the first World War, we sent abroad some two million or more.

Of course, during the first World War, we depended upon our Allies for most of our munitions. This time we are not doing that and in fact the situation is reversed.

So today, in addition to the problem of sending troops overseas, we must send almost everything else also, including food and supplies for non-combatant populations.

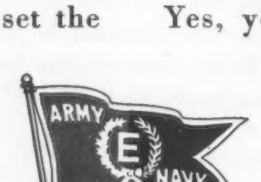
This fact, however, merely emphasizes the transportation problem. If our shipping resources permit us to send abroad no more men than we have so far, how long will it take us to put an army or armies of ten million where they will do the most good?

So far the war emphasis has been on production. We have now licked this problem, primarily by putting the best brains in the country to work on it. From now on, the increasing weight of responsibility will come upon transportation. Would it not be well to ask if we are organized to meet it?

J. H. Van Deventer

Better Steels are Coming— from the Tests of War

Hour after hour, month after month, Inland metallurgists study not only the needs for this war of steel, but also the requirements of a victorious America—the America that will turn again to peacetime developments in the crafts, and in the sciences—new developments that will prove again that free peoples set the pace for others to follow. Coming out of the tests of war are finer steels—steels that will set new standards of safety and speed in transportation. Steels that will help bring the newest advancements in swift communications into most homes in the land. Steels that will bring new conceptions of beauty, convenience, comfort, and utility—all at prices that can be afforded by the average American. Yes, you can look forward to the day when steel from Inland, now flowing 100 per cent into war products, will help build a greater America.



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Ordnance Inspection of CASTINGS

By A. C. RICHMOND
Chief, Inspection Division, Chicago Ordnance District

. . . Helpful suggestions on how to prepare for and facilitate inspection of castings by ordnance inspectors are given in this article. Based on extensive experience in this field, the author lists some of the commonest defects turned up by ordnance inspectors and discusses the philosophy behind ordnance inspection. How this inspection may be used as a tool for lowering foundry production costs is also pointed out.

A VITAL phase in the production of ordnance castings is inspection. Foundries undertaking the production of ordnance castings for the first time, as well as plants already producing such material, probably have a number of questions in mind concerning various phases of such inspection.

This article has been prepared with the hope that it will answer some of these questions and in this manner prevent needless delays of production and avoid the scrapping of incorrectly made castings.

Occasionally the necessity for ordnance inspection is questioned. It might be well to discuss this first. As a rule, a company man or group of men are assigned to inspection. In many cases these men also clean or ship the castings.

There is no question but that these men are conscientious, but they are apt to make close decisions in the foundry's favor. Too, they are accustomed to producing castings for peace time applications, not war equipment. Seemingly small defects from the viewpoint of an ordinary commercial casting may be passed or filled with a weld, whereas this is not authorized by the ordnance department. Sometimes obviously serious defects are missed. This patently cannot be tolerated in ordnance castings which are subject to extreme shock or vibration.

A seemingly inconsequental surface flaw, which was passed by a foundry inspector, is shown in Fig. 1. An X-ray of this flaw, Fig. 2, reveals that a large shrink or area of porosity lies beneath the surface.

Fig. 3 shows cracks in another casting of the same type, obviously bad, but also passed by the foundry inspector. These parts are all subjected to strain, and incorporating such castings into a fighting unit could have serious results.

A large number of alloy steel castings with a polished and flame hardened working surface have been found to have unauthorized welds on this surface. The fact that the weld could not be satisfactorily hardened meant only less wear resistance. However, since this part is subject to serious shock and constant vibration, the weld might become loosened, act as a wedge, and lock the entire mechanism.

As numerous defective castings are found daily, a large number of examples may be cited, examples which were all found after the foundry had passed the castings. This situation

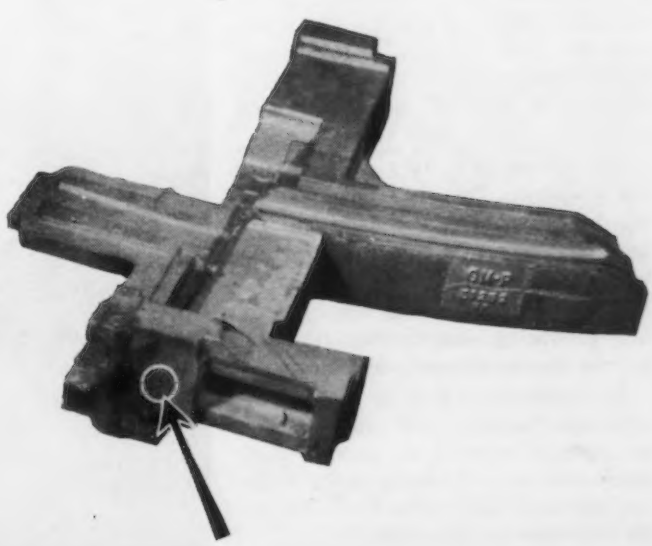


FIG. 1—A small defect (in circle) in an artillery casting weighing approximately 60 lb. The true extent of this defect is shown in the radiograph, in Fig. 2.

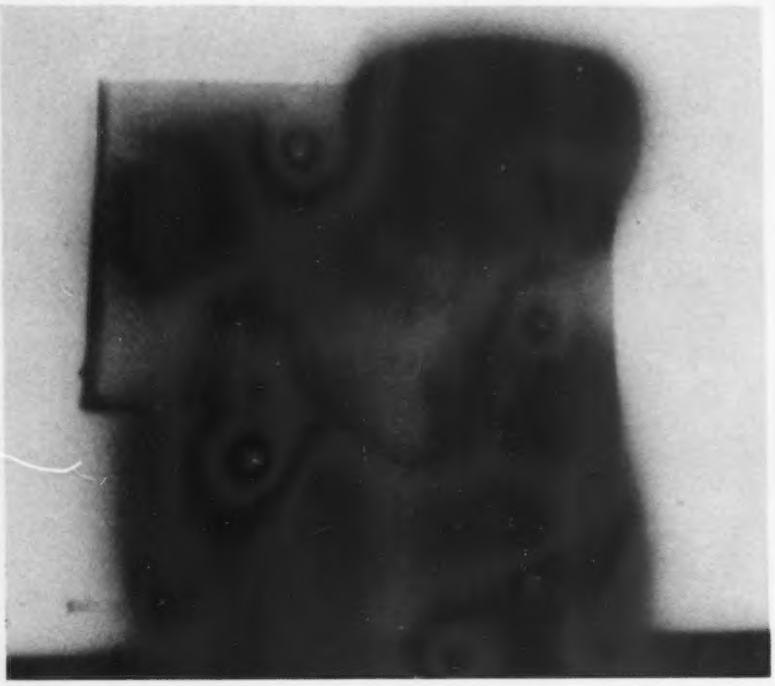


FIG. 2—A radiograph of the defect shown in Fig. 1. Note the extent of the shrink area, despite the small surface indication.

would not be very serious if all flaws were revealed and rejected after machining, but, unfortunately, this is not the case. Small shrinkage cracks, producing cleavage planes, may be concealed after machining.

Of course, all flaws cannot be revealed by ordnance inspection, but it is obvious that with such inspection a smaller percentage of defective parts will reach the fighting front. This is not due to a superiority on the part of the ordnance inspector, but to the psychological effect on all concerned in the manufacture and shipment of the castings, when it is known that an outside source will check the work.

Superficially it may seem an expensive inconvenience. However, if an immediate study of rejections is made, and the cause removed, serious losses to the foundry can be avoided, to say nothing of loss of machining time and good will on later rejections.

The inspector's duty is to assist the foundry. This does not mean he can be classified as a consultant. He has, however, access to many plants which are producing, in some cases, identical material. Since other plants are producing satisfactory castings, he can use their technique as a guide.

An observed difference in melting technique between two plants, or of gating and risering or pouring may disclose a rather obvious fault, which one foundry had not noticed due to its closeness to the work.

If an economical method of molding a casting is observed by an inspector, it will not be divulged to another foundry without full permission of the more efficient foundry. Superior methods are usually obtained at great cost in time and money. But since the problem often concerns vitally needed war material, it has been found that foundries usually are quite anxious to help one another.

In short, it would appear that inspection is the cheapest and most reliable form of insurance procurable on foundry profits, but, what is more important, it protects the quality and quantity of castings reaching the armed forces.

The ordnance department has streamlined its inspection procedure, without sacrificing quality, by cutting a considerable amount of red tape. To facilitate inspection, a few simple rules are followed. By adhering to the following points, the foundry should suffer no interference with its production schedule through inspection. The points to bear in mind are:

(1) Copies of the order should be forwarded to the ordnance district by the prime contractor.

(2) The foundry should have these details:
   [a] blueprints
   [b] specifications
   [c] proper test bar patterns

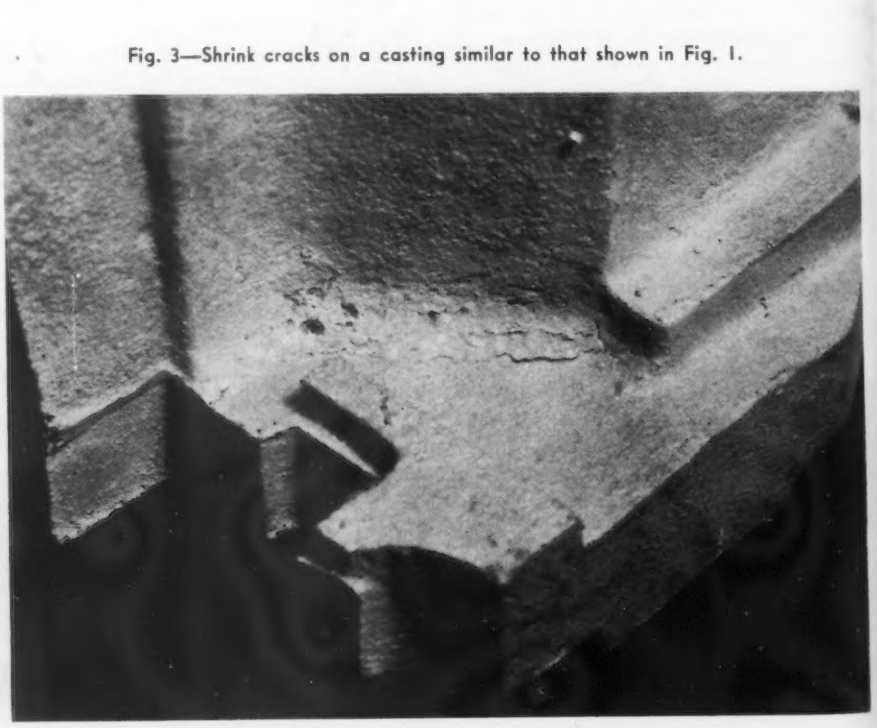
(3) Contact the prime contractor for approval of changes in pattern or casting.

(4) Notify the local ordnance office sufficiently in advance for inspection.

Whether inspection is conducted at the source or destination is determined when the ordnance district receives copies of the purchase order. If it is most feasible at the source, the foundry is notified to that effect.

Mere receipt of a pattern does not prove that dimensional requirements are fully met. A blueprint is required for all castings produced from unmounted patterns. Facilities for laying-out the work should be supplied

Fig. 3—Shrink cracks on a casting similar to that shown in Fig. 1.



by the foundry. Castings produced from mounted metal patterns on a jolt, squeezer or similar molding machine may, in some cases, be approved without a print, if the pattern has previously been approved and sample castings accepted.

Specifications

All orders must specify fully the type of metal required. When a specification is sub-divided, the composition number or class must also be stated. This is very important. Federal specifications can be obtained by writing to the Superintendent of Documents, Government Printing Office, Washington, D. C. Ordnance specifications may be obtained by writing to the Office of Chief of Ordnance, War Department, Washington, D. C. If there is an immediate need for a copy, the foundry may get in touch with the local ordnance district, which will arrange to supply a copy.

It must be stressed that the foundry should obtain a copy of the Federal specification and adhere to it. Type of scrap and analysis of materials given in the specification is determined by those expert on that type of material. In some cases it is impossible to achieve physical characteristics without rigidly adhering to the specification.

Every foundry should also have a copy of Federal specification QQM-151a, in addition to the specification covering the product in question. Specification QQM-151a deals with inspection of metals.

In non-ferrous foundries the problem of specifications is simplified by the general use of ingots of a specified composition. Of course, revert is added to the mix, but since this is presumably of a known composition it should not prove a problem. Consequently, very few rejections are due to incorrect analysis. The few rejects encountered are usually due to such obvious causes as zinc flare or contamination. Physical failures are more prevalent, however, and are commonly caused by poor melting and pouring practice, or incorrectly made test bars.

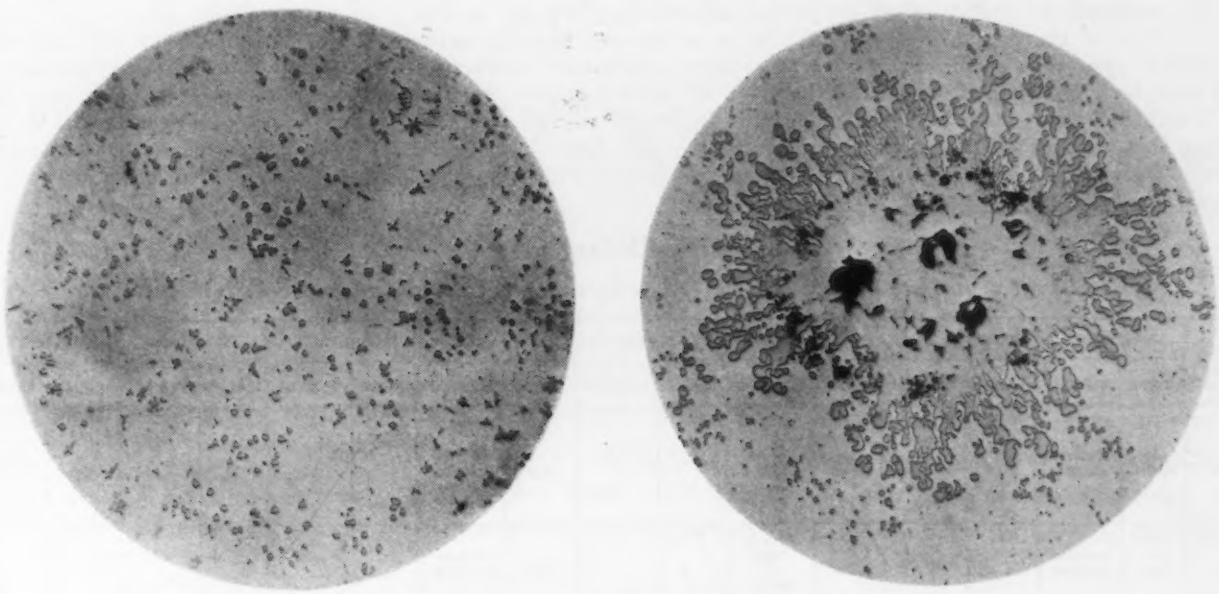


FIG. 4 — Micrograph to the left shows normal iron particle distribution in manganese bronze. Micrograph on the right shows a bad case of iron particle segregation. Both specimens not etched, magnification 100 diameters.

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A greater number of chemical rejections are made in steel. Here analysis depends entirely on foundry control. This must be exercised even after a careful selection of raw materials. In electric furnaces, bridging or an excessively sluggish slag will often result in incorrect analysis. Many foundries check before pouring to offset this.

Lack of cupola control may result in hot and cold converter blasts, leading to later difficulties. Cupola control can easily be checked by a wedge or chill test on each ladle, before transferring to the converter.

Gray iron is usually specified on a physical basis only, and is rejected for low physicals. The physicals can be raised by lowering the carbon or both carbon and silicon. Late additions of a graphitizer will produce good machinability plus enhanced physicals.

Test Bars

If the test piece is not attached as a coupon or an integral part of the casting, it is necessary to have a correctly designed test bar. Suitable bars and molding techniques are illustrated in Federal specification QQM-151a.

In cases like manganese bronze, where special test patterns are necessary, they are illustrated in the individual specification. The number of test bars required is determined by the customer, the inspector, or by the specification. The expense of test bars should be included in the quotation, as the foundry must pay for these tests, unless it is otherwise stated in the contract.

If a metallagraphic test is required, the foundry should be supplied with a standard micrograph, illustrating a suitable structure. When possible the entire cross section will be taken. In other cases the inspector will choose a part or parts. Good judgment must be used in order to select samples representing the entire casting, due to the possibility of excessive segregation in certain parts, as illustrated in Fig. 4. In ferrous material, where certain characteristics such as structure in steel, or primary graphite in pearlitic malleable are looked for, a standard micrograph may not be required. If the foundry is not equipped for this work, it is permissible to have it done at a suitable outside source.

When X-ray tests are specified they are usually used to establish correct molding technique. On accomplishing

this the X-ray test is either eliminated or used only as an occasional check. This work too, may be done at an outside source.

If pressure tests are required, the foundry should provide necessary equipment, unless other arrangements suitable to the ordnance department are made. Although not often specified, etch tests are very helpful in determining the cause of leakers. This, of course, assists the foundry in preventing future rejects.

Major defects on visual inspection are due to shrinkage and sand control. In view of the fact that rejections due to poor sand conditions are quite prevalent, particularly in steel, the "Casting Defect Chart" accompanying this article may prove helpful in overcoming some of these rejects. This chart was compiled by the H. W. Dietert Co.

Welding

Without specific permission from the inspector, defects must not be welded. The prime contractor has no authority to issue this permission. Any unauthorized welds are subject to immediate rejection, since the inspector has no way of knowing what lies below the weld.

If certain specifications cannot be met, but the foundry believes its product satisfactory, written permission must be obtained from the prime contractor to waive one specification in favor of another. The ordnance department should not be contacted on a matter of this type. If suitable, the prime contractor will obtain permission to use a new specification and forward it, in writing, to the foundry. This is also true for any pattern changes the foundry deems advisable.

The foundry will have no difficulty or delay, due to ordnance inspection, if the previously listed points are adhered to. The foundry should remember to call sufficiently in advance, and state the day and time an inspector is needed to witness a pouring. The inspector will be there, and, if necessary, will lay out a program that will fall into the foundry's production schedule.

The possible causes and cures for rejections listed in this discussion are merely examples of what has been found true in some cases and are not intended as authoritative solutions of highly controversial questions.

Casting Defect Chart

(Direct causes are printed in CAPITAL letters; indirect causes in lower case letters.)

CASTING DEFECT	MOISTURE		PERMEABILITY		GREEN STRENGTH		DRY STRENGTH		MOLD HARDNESS		FLOWABILITY		EXPANSION		FACING MATERIAL	
	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY	CAUSE	REMEDY
BLOW	HIGH	reduce moisture	LOW	reduce fines or increase grain size	high	reduce clay			high	reduce ramming					high	reduce additions
DROP	low	increase moisture			LOW	increase clay or mixing			LOW	increase ramming						
SCAB	high	decrease moisture	low	reduce fines or increase grain size	HIGH	decrease clay	HIGH	reduce	high	reduce ramming			HIGH	reduce fines, mold hardness or moisture	low	increase additions
CUT	high or low	control moisture			low	increase clay	LOW	increase mixing, moisture, sea coal or plastic bond	LOW	increase ramming					low	increase additions
ROUGH SURFACE	HIGH or low	control moisture	HIGH	reduce coarse grains	high	reduce clay and balls			LOW	increase ramming	LOW	reduce clay, coarse grains or moisture			low	increase additions
METAL PENETRATION			HIGH	increase grains below 150 mesh												
HOT CASTING CRACKS	high	reduce moisture					HIGH	reduce plastic bond, moisture or dry binder								
PIN HOLES	HIGH	reduce moisture	high	reduce grain size	high	remove balls										
RAT TAILS			low	reduce fines					HIGH	reduce ramming			HIGH	reduce fines, mold hardness or moisture	low	increase additions
GAS SEAM			LOW (Sand)	increase grain size	high	reduce clay			high	reduce ramming					HIGH	reduce additions
			high (Core)	decrease grain size												
DIRT	LOW	increase moisture			low	increase clay or mixing	LOW	see remedy for cut	low	increase ramming					low	increase additions

Note: Fines are sand grains retained on 200 mesh, 270 mesh, and pan.

—Courtesy H. W. Dietert Co.

Surface Protection of Magnesium

By S. H. BARMASEL
Associate Editor, THE IRON AGE

. . . Since the resistance of magnesium to corrosion is lowered in climates of high humidity and temperature, it is essential that the surfaces be well protected. Herein, the author describes several methods of chemically preparing surfaces prior to painting and evaluates them with respect to the alloy to be treated. What paints to use as primer and finishing coats also is discussed.

SCIENTIFIC tests show that magnesium has excellent resistance to corrosion under normal atmospheric conditions. Corrosion is speeded, however, in climates or surroundings having higher-than-average humidity and temperature, and magnesium alloys need surface protection where such conditions prevail, as in the tropics and semi-tropics. Salt in seaboard air may also increase the rate of corrosion.

In many applications, therefore, and particularly in aircraft, magnesium alloy parts should be protected with suitable coatings so that they will withstand exposure to severe atmospheric conditions. In general, the coating procedure consists of four essential steps: Surface cleaning, chemical treatment of the surface, priming and painting.

Failure to achieve absolutely clean surfaces on the metal parts to be chemically treated will almost certainly result in unsatisfactory service and early failure of the protective coating, even if approved procedures are otherwise faithfully followed. Complete removal of all foreign substances is essential, not only of dirt and oil, but oxides and other impurities. The chemical coating to be applied in the second step must come in contact with nothing but the metallic surface itself.

An easy way to test whether or not a magnesium surface is properly clean is to dip it in cold water. If, upon removal from the water, the metallic surface is entirely covered by a film of water, then the surface is clean. But if there is any break in the water film, it is certain that foreign matter is still clinging to the metal.

Any of the well known methods of solvent or alkali cleaning may be used to degrease magnesium surfaces, but cleaners of the strongly alkaline variety are considered best. Alkaline cleaning may be accomplished either by boiling, or by a cathodic electrolytic process in the alkaline solution. The following solution is recommended as satisfactory:

Tri-sodium phosphate	4 oz.
Sodium carbonate	4 oz.
Water	to make 1 gal.

This solution should be kept at a temperature between 194 deg. and 212 deg. F. when in use. Some means of agitation should be employed in dip cleaning if the bath is below the boiling point. The time necessary to insure good cleaning jobs will vary between 5 and 15 min., depending upon the type of grease that must be removed.

The solution may be used without agitation and at temperatures below the boiling point in the electrolytic cleaning process, the necessary motion being provided by gas evolution. The magnesium object to be cleaned becomes the cathode, and a direct current of 10 to 20 amp. per sq. ft. of surface on the metal is adequate. Electrolytic cleaning saves time, as it takes only 3 to 5 min. for degreasing.

Solvent cleaning may be necessary before alkaline cleaning in cases where heavy films of oil and grease cover the magnesium surface. It is important, however, that some form of alkaline cleaning be used as a follow-up step. Gasoline, trichlorethylene, naphtha and carbon tetrachloride are good solvents.

Alkaline cleaning solutions containing soap have been found satisfactory, but should not be used unless the magnesium surface being cleaned is subsequently to receive a dichromate surface treatment. In cleaning surfaces that have been previously dichromated, soap-free cleaning substances should be used. Otherwise any soap adhering to the surface will

Fifty-eighth in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

adversely affect the adhesion of paint films to the metal.

As was indicated at the beginning of this article, magnesium alloys have good resistance to corrosion when exposed to atmospheres free of salt and neither too hot nor too humid, gradually darkening as a thin oxide film is formed. This oxide film is inclined to retard subsequent attack. Some of the alloys, in fact, are more resistant to sea air and salt spray than others, but in general all alloys should be further protected when exposure to saline solutions is expected. The following are the most important methods of providing chemical surface protection.

Chrome-Pickle Treatment: Otherwise known as the acid dichromate dip, the chrome-pickle treatment is the one most often used to protect magnesium parts during storage, shipment, machining or joining. It produces the well-known iridescent-yellow appearance of magnesium products in commerce.

Application of the chrome-pickle treatment is accomplished by dipping the magnesium part in a solution made up as follows:

Sodium dichromate ..... 1.5 lb.
Concentrated nitric acid. 1.5 pints
Water .....to make one gal.

As a general rule it is best to use this solution at room temperature, as evaporation is thus reduced and concentration of the solution remains unchanged. If it is desirable for any reason to speed the reaction, however, the solution may be heated to as high as 150 deg. F.

Depending on the age of the solution, parts being dipped should be left in it anywhere from 30 sec. to 2 min. The exact time should be determined by trial. After removal from the solution, parts should then be allowed to drain for 5 to 20 sec., rinsed in cold water, and immersed in heated water (about 180 deg. F.). The rinse in hot water promotes quick drying of the metal.

If the time of dipping has been correct, the magnesium will have a yellow or red-yellow iridescent hue, the intensity of the color depending upon the composition and heat treatment of the alloy as well as upon the age of the solution used. If some areas do not appear to have sufficient coating and the general color is pale, dipping time should be increased.

HNO_3 Revives Solution

The dipping solution weakens after treatment of a number of articles, and a dip of 2 min., for example, will no longer produce the desired color on the surface of the metal. The solution may be revived at this stage by the addition of nitric acid. It is possible to revive the solution about five times before discarding the whole batch as "worn out."

The make-up of the solution should be controlled by analytic or specific gravity tests when large quantities of magnesium parts are being treated. Parts too large for immersion in regular tanks may be brushed or swabbed with fresh dichromating solution and then washed thoroughly with water.

A certain amount of metal is removed from the surface of magnesium by the chrome-pickle treatment, proportionate to the acid concentration, the time of immersion and the temperature. Under certain conditions this loss may amount to as much as 0.001 in. and, since a dimensional change of this nature cannot be tolerated on accurately machined parts, other surface treatments should be used for such applications.

Dichromate: The resistance of magnesium alloys to salt water is considerably increased if the metal parts are simply boiled in a solution of sodium dichromate. It has been found that a dip in hydrofluoric acid before boiling in dichromate solution adds to the protective character of the treatment. This process is the most widely used on finish-machined parts, as no dimensional change results.

After proper cleaning, the parts should be dipped for 5 min. (at room temperature) in an aqueous solution containing 15 to 20 per cent hydrofluoric acid by weight, then washed thoroughly in running water. They should then be boiled for at least 45 min. in a water solution containing 10 per cent sodium dichromate or potassium dichromate (by weight), followed by washing in cold water, then hot water. The dichromate treatment outlined should not be used with magnesium-manganese alloys, but is applicable to alloys containing aluminum and zinc.

Galvanic Anodize: This treatment is recommended for coating magnesium-manganese alloys, but may be used satisfactorily with all alloys of magnesium. Essentially it is a modification of the hydrofluoric acid-alkali-chromate treatment. It produces a uniform black coating and makes a good paint base, as well as providing splendid protection against saline attacks.

The cleaned parts are first immersed in a water solution of 15 to 20 per cent hydrofluoric acid at room temperature, then removed and washed in cold water. Next they are immersed in an iron or steel tank containing the same bath material employed in the alkali-chromate treatment (see below). The tank should not be allowed to come in contact with the magnesium parts, but they should be connected electrically — the tank serving as the cathode and the magnesium as the anode. For each square foot of anode area a current density of 2 amp. or more should be maintained. A current of more than 10 amp. per sq. ft. should be avoided or else a powdery coating will be formed on the metal.

This treatment should be permitted to continue for 15 to 30 min., depending upon the amount of current and the temperature prevailing. If the solution temperature is increased to 150 deg. F., the time needed for the treatment will be reduced.

Alkali-Chromate Treatment: Although this treatment has largely been superseded by the dichromate treatment, it is mentioned here because it is quite satisfactory when used on magnesium products which have been machined to fine tolerances since it causes little or no dimensional change. Following thorough degreasing and cleaning of the parts, three steps are involved.

The parts should be dipped in a water solution containing 15 to 20 per cent hydrofluoric acid* for 5 min. (at room temperature), then washed thoroughly in cold running water. Next, the parts are boiled for 45 min. or longer in a water solution containing:

**The solution is prepared by diluting one volume of technical-grade, 48 to 52 per cent hydrofluoric acid with two volumes of water.*

Ammonium sulphate 3% (weight).
Sodium dichromate 3% (weight).
Ammonia
(sp. gr. 0.880).. 0.25% (weight).

Water is added when necessary to replace the loss by evaporation during the boiling operation. After this step, the parts are washed in cold running water once more.

Third, the parts are boiled for five or more minutes in a water solution containing 1 per cent of arsenious oxide by weight, the solution having been prepared by adding 1.33 oz. of arsenious oxide for each gallon of water. Again, it must be remembered to add water to replace that which boils away. Finally the parts are washed in cold running water, then dipped in hot water.

The coating resulting from this treatment is black or dark brown, according to the composition of the alloy

and the condition of the solution in the second step.

Chrome-Sulphate Treatment: Where it is important that the electrical resistance of the treatment be kept low, the chrome-sulphate treatment is usually indicated. It can be applied to all commercial magnesium alloys except magnesium-manganese. The solution used contains 8 oz. of magnesium sulphate and 6 oz. of sodium dichromate per gallon of water. Parts should be immersed for 15 min. at a temperature of 160 deg. F. Absolute cleanliness of the parts is vital to the success of this treatment. It should be remembered that this treatment is recommended for one specific purpose, and that it does not provide as satisfactory a paint base as the dichromate treatment or several other methods of chemical surface protection.

Chrome-Alum Treatment: This treatment provides die castings of magnesium with a decorative black finish which is a good paint base. Parts should be immersed for 2 to 15 min. (long enough to obtain the desired black color) in a boiling water solution containing 4 oz. of potassium chrome-alum and 13 oz. of sodium dichromate per gal. A more uniform coating will result if the die-cast surface film is first removed by machining, sanding, brushing or buffing.

It should be remembered that when high resistance to salt water corrosion is needed, the hydrofluoric acid-dichromate treatment will give better protection than the chrome-alum treatment.

Extensive tests have been made on surfaces treated by the various methods described above to determine their comparative qualities as bases for subsequent paint coatings. These tests have shown the following to be the best surface treatments for magnesium-base alloys containing aluminum, zinc and manganese: The dichromate treatment; the alkali-dichromate treatment, and the galvanic-anodizing treatment.

For magnesium-manganese alloys, the chrome-pickle and galvanic-anodizing treatments are best. The chrome-pickle and chrome-sulphate treatments are recommended when electrical resistance of the treated surface must be kept at a minimum.

Painting Systems

A given system of painting will naturally appear to give the best protection on alloys primarily most resistant to corrosion, assuming the paint is applied in the same manner in all cases. It is obvious that magnesium applications which are likely to be subjected to corrosive and adverse atmospheric conditions should receive the greatest protection possible. The use of chemical or electrochemical surface treatment in combination with paint coatings will provide such protection.

The priming coat of paint for surface-treated magnesium parts should be chosen because of adhesive quality, corrosion-inhibitive properties, and resistance to moisture penetration. Adhesion is the most important factor to be considered, however. Many primer pigments have been tested, and only zinc chromate has shown good corrosion-inhibiting properties. Thus it should constitute essentially all of the primer's pigment content.

Certain of the synthetic resin varnishes are excellent primer vehicles with respect to adhesion and moisture exclusion. The P27 zinc chromate type of primer is highly recommended. Varnishes made with 100 per cent phenolic resins and of moderate oil length are best suited for use on surfaces which will come in contact with salt water.

As to finishing coats, the actual service conditions anticipated should determine the number needed to protect magnesium alloys properly. For severe conditions, three finishing coats in addition to the priming coat are

LIFTING freshly dichromated magnesium parts out of the tank containing a water solution of 10 per cent sodium or potassium dichromate. This treatment is followed by washing in cold and then hot water.

required for proper protection. This would therefore be referred to as a four-coat system.

The resistance to moisture penetration is perhaps the most important characteristic to be sought in the paint for finish coating. Such resistance depends upon both the pigment and the vehicle used. Tests have conclusively proved that aluminum paint can be made with higher moisture impedance than any other paint, and excellent results are obtained with a ratio of 2 lb. of standard aluminum paste per gal. of vehicle.

For finishing coats, phenolic resin varnish vehicles are best. Varnishes short in oil have superior protective properties to longer oil varnishes. Highly satisfactory results have been obtained with aluminum pigment in a 20-gal., 100 per cent phenolic resin varnish containing about one-fourth linseed oil and three-fourths tung oil.

New System for Locking Studs and Inserts

A STUD locking system which can be adapted to any function performed by ordinary studs or by threaded inserts in soft materials like the light alloys or wood has been developed by Jose Rosán of Hollywood, Cal. The units comprising this system are manufactured under license by Bardwell & McAlister, Inc. A simple ring with serrations inside and out is forced into place over interlocking serrations built into the stud head, making a tight fit flush with the surface of the material in which it is used. The stud differs from an ordinary stud in that it has a central collar equipped with teeth. It is screwed in until the top flange of the serration is flush with or slightly below the surface of the material. The ring then falls into place, and with a special tool or a short length of bar steel bored to clear the stud, the operator drives the ring into the countersunk hole prepared to receive it.

Use of the ring is intended to prevent the stud or insert from turning in its location. To accomplish this, the ring is fitted along its outer periphery with V-shaped splines. When seated in either hard or soft material, these splines, by broaching their way into the material, act to hold the ring and, through the interlocking arrangement with the mating part, hold the insert or stud firmly in place.

Installation of the insert is made with a threaded tool and lock nut and a driving tool with which to force the ring in place. Operations for installation may be done manually or with power. In the absence of the special tool, installations may be made by using an ordinary bolt and nut to screw the insert into position and by using a hammer to drive in the locking ring. Removal of the insert is accomplished by drilling to a depth equal to that of the serrations between the ring and insert. Then the insert is lifted with special tool.

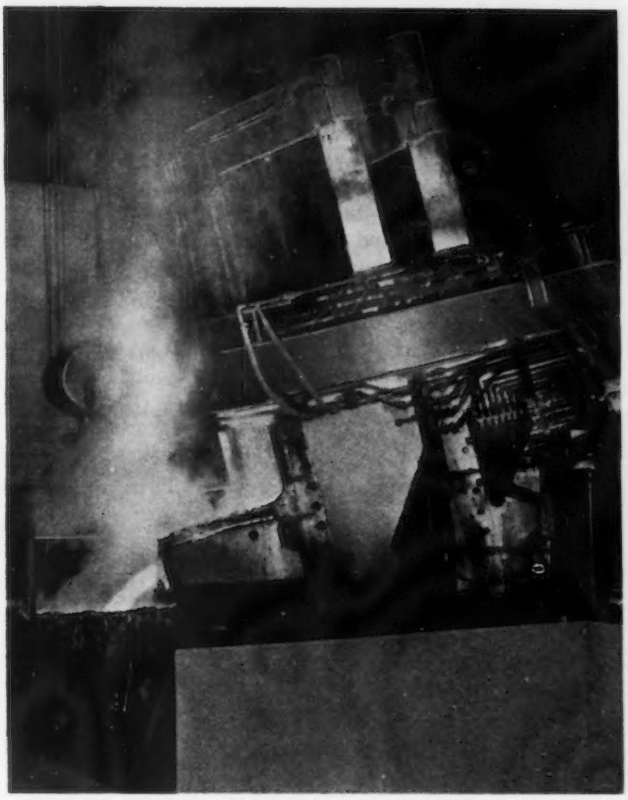
Rings are made from SAE X1112 screw stock. Inserts and studs also may be cut from free cutting screw steel, chrome moly steel or bronze. To insure accuracy of fit, the ring diameter is held within tolerances of +0.002 and —0.001. Clearance between the inside of the ring and outside of the collar varies from 0.006 up, depending upon the insert's size.

Locking action of the ring and its mating parts, which prevents studs and inserts from unscrewing under a variety of conditions, is accomplished by a combination of several engineering principles. The spline action is the basis for its positive lock, and a number of splines or serrations are located in the insert or stud to be locked.

Tests at various aircraft plants have shown these inserts are capable of withstanding the desired loads on materials such as plywood, solid wood, phenolic plastics, translucent plastics, micarta, aluminum, aluminum alloy and magnesium alloy. Both inserts and studs may be used to fasten clamps to jigs and fixtures built of wood or masonite. This means of locking can be also adapted to such applications as drill bushings, spark plugs, plugging holes and electric terminals.

JOSE ROSÁN, inventor of the new locking system, is shown explaining the action of serrated rings on a steel insert. This locking system can be adapted to any function performed by ordinary studs and threaded inserts.

INSTALLATION of Rosán studs and inserts is easily accomplished as this picture of a stud (center) and insert (right) in plexi-glass shows. With special tool, locking ring is being hammered into place around insert head. Procedure is the same for wood and metal. A locking ring is shown at the left.



Converting to STEEL CASTINGS

By JAMES H. SMITH
General Manager, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.

. . . The story of the conversion of the world's largest producer of malleable castings to the production of steel castings on a continuous basis in order to better serve the war effort is told in detail in this article. Some of the equipment and many of the methods discussed herein are most unusual in steel foundry practice and should prove of great interest to plants already producing steel castings, as well as to plants planning to undertake such work.

THE steel casting industry is an outstanding example of an industry abruptly forced from its ordinary peacetime position to one where the demands upon it are far in excess of the available production capacity.

For many years the Saginaw Malleable Iron Division of General Motors Corp., the world's largest producer of malleable castings, has been engaged in the production of malleable iron for automotive use, and, more recently, in the making of "Arma-Steel" (pearlitic-malleable)* castings which have found widespread acceptance as a replacement for certain types of steel forgings and bar stock.

** First technical description of Arma-Steel appeared in* THE IRON AGE, *issue of May 25, 1939.*

Anticipating an increased demand for malleable and ArmaSteel products, this company decided early in 1941 to substantially increase the productive capacity of the plant. This expansion program was nearly completed at the time war was forced upon us by Japan. The entrance into the war completely altered the nature of the demands the country was to place on the iron and steel industry. A careful survey revealed that it was very doubtful if the requirements for war work would completely utilize the company's expanded malleable facilities and at the same time it was becoming increasingly obvious that the existing steel casting production capacity would be woefully inadequate to meet the accelerated demands of the war.

This picture led to a consideration of the possibility of putting to use the company's idle capacity by starting the production of steel castings. The fact that many of the steel castings required for war purposes were of a nature adaptable to volume production in a conveyorized type foundry influenced the decision considerably.

Frankly facing the fact that the entire history of Saginaw Malleable's operation has been in the volume production of small castings, that the "know-how" of the personnel and the nature of plant facilities are built around this type of operation, it was decided to start making steel castings, but within the boundries of firm management policies that took full cognizance of these facts.

In January, 1942, the necessary priorities were obtained to enable the purchase of additional equipment needed to complement existing facilities for a tentative production capacity of approximately 2500 tons of steel castings per month. The first experimental steel heat was poured on March 2, 1942, and by the latter part of March production castings were moving into the finishing departments in steadily increasing numbers. By the end of October a tentative goal had been surpassed with the production for that month alone slightly in excess of 2700 tons.

None of the personnel had past experience with cast-steel and only one experienced steel man, a melter, was added to the organization. However, a thorough training in efficient handling methods stood in good stead and a speedy and successful conver-

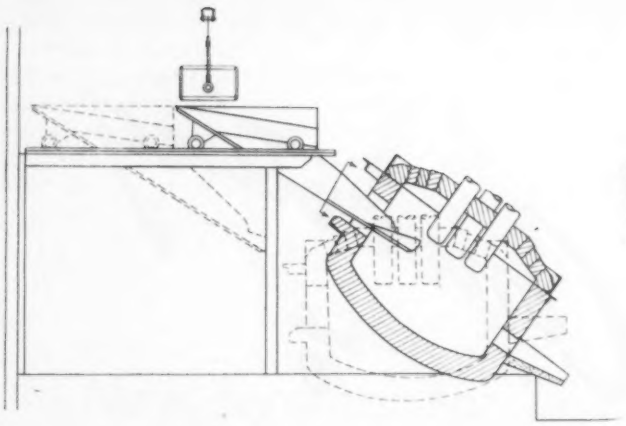


FIG. 1 — Chute for charging the electric furnace. Diagram in dotted lines shows chute in idle position.

sion to steel production was affected. Blunders were made, but some of the company's ideas proved out and have resulted in methods of manufacture considered revolutionary to steel foundry practice and have affected substantial savings in man-hours, an improved metallurgical control and an entirely satisfactory product. The methods used are really nothing entirely new however; they have been used for some years in making malleable castings.

To conform to the company's mechanical facilities and the experience of the organization, the company contracted to make only steel castings in a weight classification not in excess of an arbitrary figure of 50 lb. Although steel castings are commonly made in several classes of chemical and physical properties, it seemed desirable to concentrate efforts on one or two classes of steel if the volume of the demand in those categories was sufficient to permit specialization.

The huge quantities in war demand for certain castings with high physical properties lent new life to the idea of a volume production set-up. Also the production of this steel entailed the use of considerable heat-treating capacity and, as the forecast of war requirements showed definite limitations in the use of malleable iron, a sufficient amount of heat-treating equipment was available here to handle the contemplated steel program of 2500 tons a month.

To submit the pertinent facts without further elaboration, the company is at present producing a manganese, copper, molybdenum steel. The work consists of a few jobs required in very large quantities and several parts scheduled in fairly small lots. The high production parts, of course, make up the bulk of the tonnage.

Anticipating the comment that the mechanized set-up is made possible only by the grace of unusual war demands which permit specialization, it is freely admitted that current production is of a type not commonly found in the steel casting industry prior to Pearl Harbor.

However, these two facts should be kept in mind. First: The company's decision to make steel was hedged by the provision that it would stick to the methods that had been used successfully in making malleable iron and which were thoroughly understood, in contrast to the conventional steel-foundry set-up which was quite foreign to the company. Second: The picture of the steel casting industry prior to the war does not necessarily form a set pattern which cannot be changed and improved when peace comes again.

The accelerated pace of steel casting production during the war, if wisely matched with improved manufacturing methods and improved metallurgical control resulting in a lower-cost, higher-quality product, can do much to break down the traditional antipathy toward steel castings and bring consideration of their possible use in fields heretofore conceded to other materials or other forms of steel.

The melting department of the plant occupies only about 7800 sq. ft. of floor space and is equipped with two large and one small acid cold-melt electric furnaces. The entire foundry layout is keyed to the idea of continuous, synchronized operations and as a basic factor in maintaining this continuity the furnaces are fired and tapped in rotation, thus delivering an uninterrupted supply of molten steel to the pouring section of the mold conveyor. Normal 24-hr. operation yields approximately 200 tons of cast steel a day, made up of 20 8-ton heats from the large furnaces and 10 3½-ton heats from the small furnace.

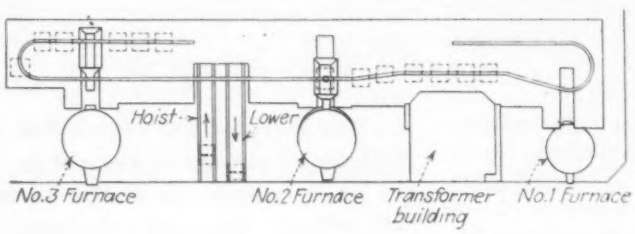


FIG. 2—Floor plan of the furnace and charging system.

Since no sulphur or phosphorous can be eliminated in the acid electric process, the control of the steel must start with the materials charged into the furnace. In order to keep these two elements at a minimum, and also to avoid excessive amounts of residual alloys which might affect the physical properties, all incoming steel scrap for melting is unloaded in piles according to its analysis. The charges are made up using specific amounts

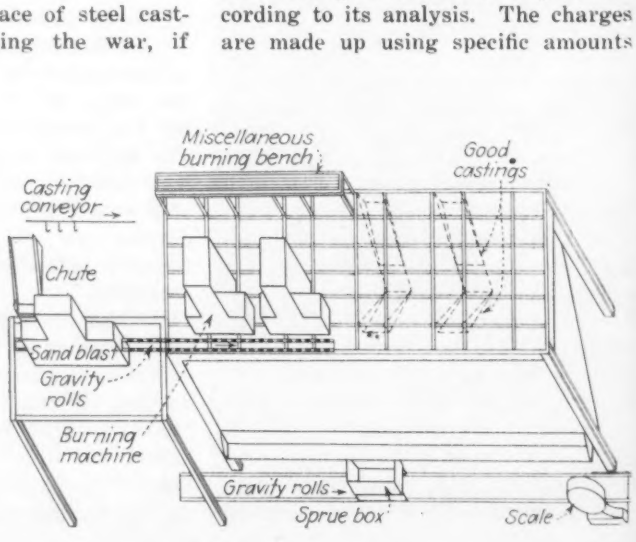


FIG. 3—System for handling sprues. From the scale, the charging box will progress as shown in Fig. 2.

from the various piles according to a charge sheet made out by the metallurgist.

After melting down each charge in the electric furnace, a sample of the metal is poured just prior to the boil. This sample is later analyzed for carbon and manganese and serves as a guide to keep the melt-down carbons as consistent as possible.

Following the boil, a preliminary sample is poured in a Carbanalyzer mold. After chilling, this sample is placed in the Carbanalyzer (an electrical instrument for determining carbon content) and the carbon reading obtained in a matter of seconds. This operation, which each melter must perform himself, gives the necessary information to finish the heat without delay. Another sample poured from the same cup of steel is later analyzed for carbon and manganese in the laboratory.

A sample of the finished steel is taken for complete chemical analysis after the bull ladle is approximately half emptied. The slugs from which test bars are turned are also poured at this time. All of the above analyses are complete in approximately 1½ hr. after tapping the heat.

A study has been made of finish slags and their relation to metal control. As a result, each melter is required to pour a sample pancake of slag on each of his heats just prior to tapping out. These samples are brought to the laboratory along with the steel samples and are checked for color and general appearance as a further means of maintaining control. Periodic analyses are made of the slags as an absolute check on color and appearance.

Quenching and drawing cycles and temperatures are established and checked by the laboratory. Sample castings are tested regularly from the draw furnaces throughout the day to assure correct Brinell hardness. Samples are also taken periodically for microscopic inspection of the structure to insure that the heat treatment has been proper. Gamma-ray radiography is used extensively as a means of developing gating technique to insure sound castings.

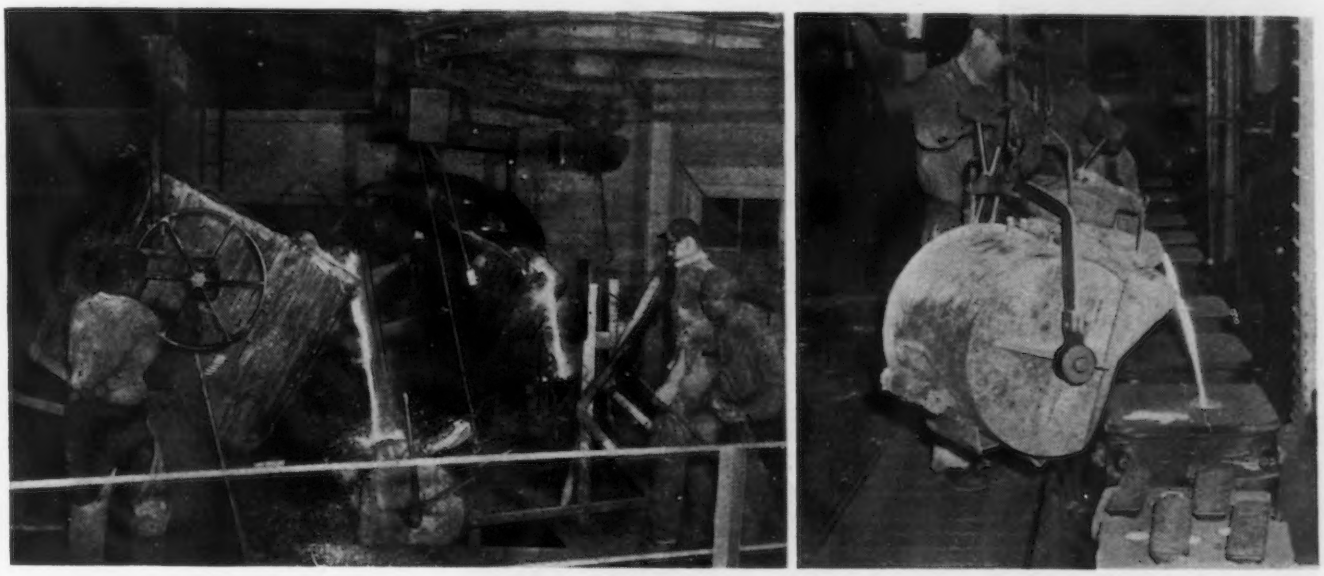


FIG. 4—Handling molten steel. Steel is held in the 5-ton bull ladles shown in photo on right for feeding the ¼-ton covered teapot ladles. Molds are poured from this teapot ladle on a moving conveyor.

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Charging Procedure

The charge materials, consisting of shop steel scrap, sprues, bushling, bundles and briquettes, are at present loaded from the floor into 36 x 36 x 22-in. cradled dump boxes mounted on skids. As each box is loaded it is moved by electric truck from the loading station to a set of scales.

After weighing, each loaded box is moved by electric truck from the scales to the furnace floor and raised by electric hoist to a monorail above an elevated charging platform. The charges are loaded during the melting time, consequently complete charges for each furnace are stored on the monorail, which runs the entire length of the furnace floor.

The mechanical operation of the furnace charging setup is shown diagrammatically in Fig. 1 and 2. Fig 1 shows the charging chute in both the idle and charging position, while Fig. 2 is the overall plan of the charging system.

Each box of the charge (three to nine boxes) is moved along the monorail and dumped in the chute. As the charging progresses the furnace may be lowered and the chute backed out to distribute the charge evenly from front to back. The flaring design on the end of the chute serves to force the material to the sides of the furnace and eliminate any tendency of the material to pile up and plug the chute.

The charging having been completed, the empty boxes are lowered to the furnace floor by electric hoist, picked up by electric truck, and returned to their respective loading stations to be refilled.

Side charging furnaces are generally considered inefficient because of the time required to charge them. However, the efficiency of the system outlined here is evidenced by an average charge time of 10 min. per eight-ton charge.

Plans have been drawn up and construction begun on a new system of handling and loading sprues, which constitute approximately 50 per cent of the total charge. This layout is shown diagrammatically in Fig. 3.

With this layout, sprues will be raked into the boxes from elevated chutes, which originate at disposal bins for the sprue burners working on an overhead platform. Gravity rolls will serve to convey the boxes under the chutes. As each box is filled it will be moved down the rolls to the scales, and from this point the

cycle will be the same as the present system previously described.

Five-ton bull ladles, handled by an overhead crane, serve to transport the molten steel from the furnaces to the holding station where the pouring ladles are filled. As each heat is tapped, it is moved directly to the holding station and placed on one of three stationary cradle standards from which the pouring ladles are serviced.

As a general rule there are two bull ladles of steel at the station at one time, since two ladles per heat are tapped from the large furnace and the heat from the small furnace replaces one ladle of a large heat.

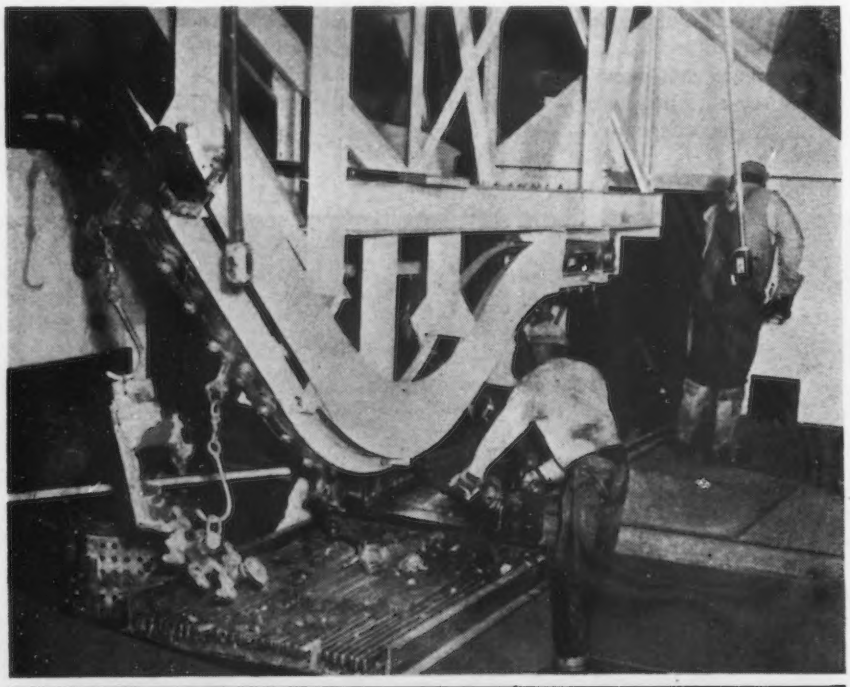

FIG. 5—Top photo shows the hot casting hook-up station where castings, after shakeout, are loaded on the moving conveyor. Lower view shows the green casting inspection and sorting conveyor.

Pouring Molds

Steel is poured into the molds from ¼-ton covered teapot ladles, which are carried by electric hoists on an "L" shaped monorail loop. A moving pouring floor 37 ft. 6 in. long synchronized with an endless type plate mold conveyor facilitates continuous and efficient pouring. Fig. 4 shows this pouring set-up.

When the pouring ladle is emptied it is moved on the monorail to the holding station to be refilled from a 5-ton full ladle. As each empty ladle is moved away from the conveyor a full ladle replaces it at the head of the conveyor.

Possibly one of the major problems of a steel foundry that melts an acidic high-manganese steel is that of maintaining long life in ladle linings. In view of this fact it is worthy of note that an average of 100 heats per lining is obtained with the previously described bull ladles and nine heats per lining with the pouring ladles. Both type ladles are lined with a sized Western ganister and a mixture of silica, alumina and iron oxide.

The molds are made on automatic jolt and squeeze, pattern stripper type moldings machines. Ten machines (five drag and five cope) are located in a line outside and along one side of the loop of an oval-shaped endless, power-driven plate mold conveyor. The drag halves of the molds are placed on the conveyor and moved at a constant speed down a slight incline past the cope machines. The purpose of the incline is to lower the drags to such a height that the copes may be placed easily and carefully with a minimum amount of positioning. After the molds have been closed they proceed past a clamping station and on to the pouring floor.

The mold conveyor, moving at a speed of approximately 17 ft. per min. carries the molds alongside the moving pouring platform and through the cooling hood to the shakeout in about 18 min. The cooling side of the mold conveyor loop is below floor level to permit easy access to the molding side for the setting of cores in the drag halves of the molds.

On a continuous molding unit it is necessary to have a constant supply of uniform quality molding sand, properly prepared and conditioned to produce a sound, smooth casting free from surface defects. Most steel foundries use a facing and backing sand which they feel is necessary to produce a satisfactory casting. This company found in its malleable iron practice that accurate laboratory control of the molding sand made it possible to use only one sand. This practice was carried over into the steel operation and every steel casting mold is made of the same system sand, no facing being used. The sand is mixed and conditioned in a completely mechanized sand system and belt conveyed to four-ton storage

hoppers over each molding machine. The sand is fed from the hoppers to the molds, as needed, by vibrator feeders.

Date pads that may be quickly and easily changed are used on all patterns for identification purposes. For convenience in hooking the hot castings onto the casting conveyor at the shakeout, large eyes are cast either at the parting line or on the sprue, whichever the design of the part permits.

At the shakeout the molds are dumped on a short inclined vibrating shakeout screen which serves to remove and dispose of the sand and to feed the castings to a second vibrator at right angles to the shakeout screen. The purpose of this screen is to spread the castings and move them to the hookup station, Fig. 5, of the hot casting conveyor.

The hot casting conveyor is of the power driven, endless, individual hook type, having a total length of 850 ft. The cooling portion of the conveyor is approximately 500 ft. long, all of which is out of doors.

Upon re-entering the building, the castings are unhooked from the conveyor manually and dropped down a chute into dump hoppers. There are two such stations along the conveyor. Thus, the castings that may be broken at the gate are kept segregated from those that must have the gate burned off. An improvement in this part of the company's process is now in operation.

The casting conveyor, upon re-entering the building, passes over an elevated platform about 12 ft. above the floor level. Automatic fixtures for burning off the gates and sprue are located on the platform on either side of the conveyor. Castings are unhooked from the conveyor and placed in the burning fixtures. The sprues, after separation from the castings, fall into hoppers which feed directly into boxes for recharging into the electric furnaces. The castings slide down separate chutes into tote-boxes for transfer to cleaning, chipping, and grinding operations prior to heat-treating.

As a general rule, removing gates from steel castings is a slow and expensive operation. However, the rate of production of this operation has been increased and a potential bottleneck eliminated, by the following improvements:

(1) Developing an automatic burner (Fig. 6) to handle a particular part which constitutes a large portion of our production. The automatic fixture is considerably faster than the manual burning operation.

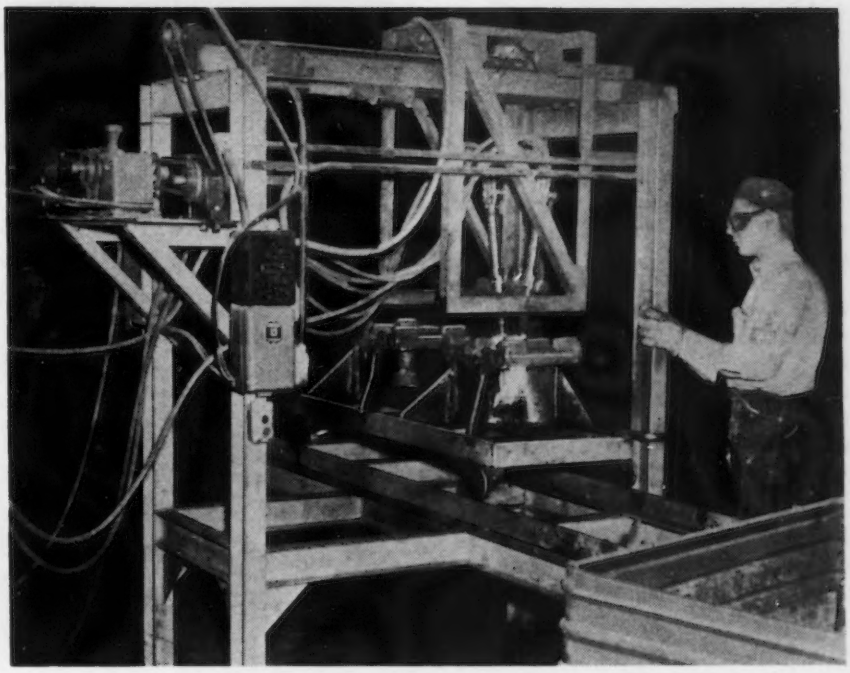

Fig. 6—Gate burning is speeded up by use of this automatic burner.

(2) Redesigning the gating on those jobs where it was possible to enable separation from the sprue either by hand-breaking or by breaking in an air actuated drop hammer.

(3) Substituting natural gas for acetylene gas in burning operations.

Green steel processing consists of inspection to eliminate defective castings and snag grinding of gates. The castings are passed over a belt conveyor, Fig. 5, which spreads them out in a manner which facilitates quick inspection and easy sorting.

Many castings are sorted directly into hoppers which service a grinding machine at floor level below the conveyor and the balance is sorted into tote-boxes.

All grinding is done on high speed, dual wheel, floor stand grinding machines using a 24 x 3 x 12-in resinoid bonded grinding wheel.

There are two phases in the heat-treating process at this plant, quenching and drawing. Both are continuous rather than the customary batch type process. The quenching phase of the heat treatment is a combination of normalizing and quenching, and is done in a gas fired radiant tube automatically controlled furnace which is two trays wide and 46 trays long. The furnace is operated on a 12.3 hr. cycle (16 min. pushing interval) which is split approximately as follows:

Heating to 1600 deg. F.—9 hr.
Hold at 1600 deg. F.—3 hr.

The castings are oil quenched from the furnace at 1600 deg F. by pushing the trays of hot castings out of the furnace onto an automatic tipover fixture, which dumps the castings into the oil quench tank and retains the trays. The tipover fixture rolls sideways to permit the empty trays to be discharged onto gravity rolls for return to the charging or loading end of the kiln.

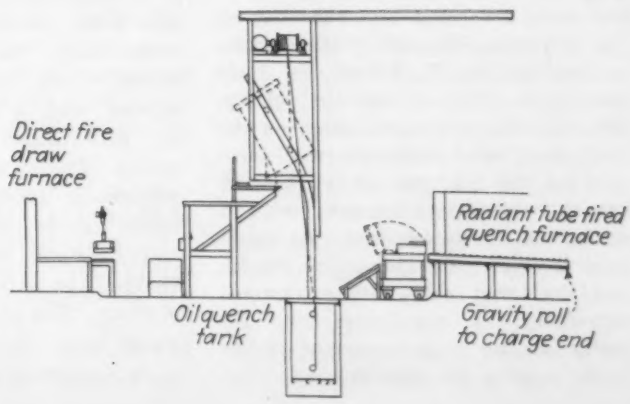

FIG. 7—Steel casting oil quenching system.

After a short period of immersion the basket containing the castings is raised out of the oil tank and the oil allowed to drain from castings. Then the basket is raised above a dump hopper, inclined to an angle of 45 deg. and the castings released to the hopper through side opening doors. The oil quenching system is shown diagrammatically in Fig. 7.

Two direct fired, automatically controlled draw furnaces, two trays wide and 13 trays long, are used for drawing. The furnaces are operated on a 6.5-hr. draw cycle (30 min. pushing interval) which is split up approximately as follows:

Preheat to 1200 deg. F.—5-hr.

Hold at 1200 deg. F.—1½ hr.

Leaving the draw furnaces the castings are ready for finish processing and final inspection.

Cleaning and final inspection constitute the major portion of the final processing work. All cleaning is done with shot-blast type cleaning machines. After cleaning for 10 min. each casting is given a thorough visual inspection for external defects. In some cases the castings are gaged 100 per cent for size.

Incorporated with the external inspection is the casting cut-up inspection. Castings of each type made are picked at random from each heat and cut into many pieces and deep etched as a means of finding internal flaws that might prove detrimental to the quality of the casting.

At the present time we have two parts which require three surfaces flame hardened to a minimum hardness of 47 Rockwell C ¼ in. deep.

The flame hardening machines in operation are shown in Fig. 8. These machines are of our own design and construction. Each machine is capable of hardening approximately 1300 castings a day and each operator runs two machines.

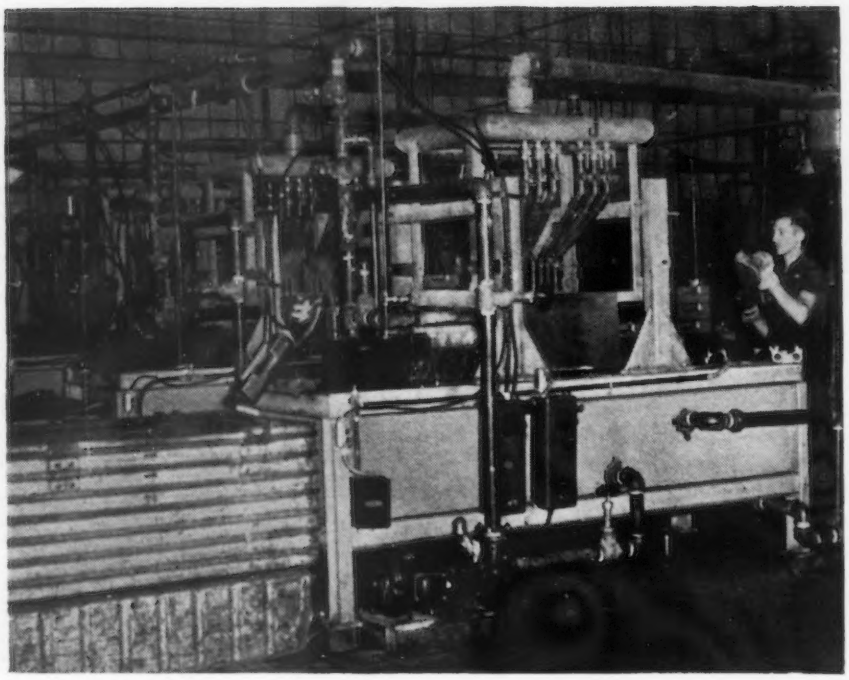

FIG. 8—Flame hardening machines. Each unit is capable of hardening 1300 castings a day.

A mixture of 10 parts air and one part natural gas by volume, fired at a pressure of 3 lb. per sq. in provides the flame for hardening. Each casting is heated approximately 1 min. then moved mechanically to a continuous water quench. As each successive casting is placed in the machine it forces the preceding castings through the machine and into a tote-box.

Concluding this general outline of Saginaw's steel operations, the importance of efficient material handling methods should be stressed. It was found in our malleable iron practice that the dividends were appreciable in terms of lower costs and higher production when close attention was paid to the elimination of unnecessary operations, correct positioning of machines and fixtures with regard to the work to be performed, and the reduction of the number of handlings and distances traveled by the castings between work stations.

It is this company's opinion that bottlenecks inevitably occur unless proper recognition is given to the problem of material handling as a major factor in any continuous, synchronized production set-up. Despite this company's short experience in producing steel, we believe that the steel casting industry will continue to hold an important position in the future.

Melting of Bushy Steel Turnings

A METHOD of reducing the bulk of bushy steel turnings which has been developed and patented by the Dortmund-Hoerder Hüttenverein, is described by F. Köhler, in *Stahl und Eisen*, 1942, vol. 62, Oct. 29, pp. 921-922. The process is based on the fact that steel turnings will burn without the addition of a fuel. A vertical cylindrical furnace with a conical bottom is required; the upper part is lined with refractory bricks, and the lower part with a rammed refractory. A circulation pipe for water cooling is incorporated in the lining around the hottest zone. The furnace stands on four columns, about 4 ft. high, under which a conveyor belt with cast iron trays moves to carry away the product from the mouth of the cone. Ignition is commenced with a small wood or coke fire, after which no more fuel is required. The furnace requires almost continuous feeding with turnings, which can be done by a crane and grab, and it makes no difference whether the turnings are clean, oily or rusty. The partial burning of the lowest layer of turnings develops so much heat that a certain proportion melts without burning and the remainder break up into shorter lengths. The product leaving the bottom of the furnace consists of metallic iron with a small portion of oxide and a large proportion of broken-up turnings. An average sample of the product contains 90 per cent of metallic iron and 10 per cent of oxide. The output of the furnace is about the same as the rate at which turnings can be unloaded from a railway truck with a steam crane. Two furnaces of this type have been in successful use for over a year.

CENTRIFUGAL CASTING

By NATHAN JANCO
Centrifugal Casting Machine Co., Tulsa, Okla.

. . . With so many eyes in the metal industry and in ordnance design departments focused on centrifugal casting, this article is especially timely. The author discusses the principles used in selecting the proper centrifugal method for a given casting job and the fundamentals of gating, and gives some examples of typical centrifugal castings. This article is abstracted from a paper originally presented at the regional foundry conference held by the Wisconsin Chapter of the A.F.A. and the University of Wisconsin. For another article on centrifugal casting, see THE IRON AGE, issue of April 1.

THE art of centrifugal casting has gained considerable impetus over the past few years and this process is making important contributions to the war effort. Many metal parts, previously made from forgings, have been converted to centrifugal castings. As more and more experience is gained in the field of centrifugal castings, the unusual qualities which can be imparted to various types of metals by this "liquid forging" are finding extensive use in breaking bottlenecks and improving the quality of fighting equipment.

In order to more fully utilize the advantageous characteristics of centrifugal castings, the War Production Board, the Army Air Forces and the Ordnance Department have all assigned men to the task of determining what parts may be centrifugally cast that are now produced by other methods. An advisory committee to the War Metallurgy Committee has been formed specifically to correlate this work. Liaison officers of the service groups meet with this body periodically and discuss the possibility of converting to centrifugally casting parts which are now critical or which are expected to become critical. The advisory committee endeavors to establish the practicability of this conversion and suggests techniques.

In these meetings some parts are approved for centrifugal casting, while other parts are tentatively approved but subjected to further experimentation. This advisory committee does not hesitate to recommend that parts be statically cast which are now forged, where this procedure is deemed feasible.

The facilities of a number of foundry laboratories have been made available to the advisory committee for this experimental work. These foundries are used to produce sample castings for testing by the interested branch of the service involved. If, after these tests, the castings are approved for production, the matter is turned over to WPB to facilitate such production.

Thus far a few projects have been completed for the Ordnance Department and many others are in various stages of development.

A complete bibliography of centrifugal casting literature is also being compiled by the committee for distribution to foundries engaged in centrifugal casting and to plants entering this field to make war material.

In addition, a research project has been set up to study the flow of heat across metal molds used in centrifugal casting, while another project, the compilation and discussion of the mathematics underlying centrifugal

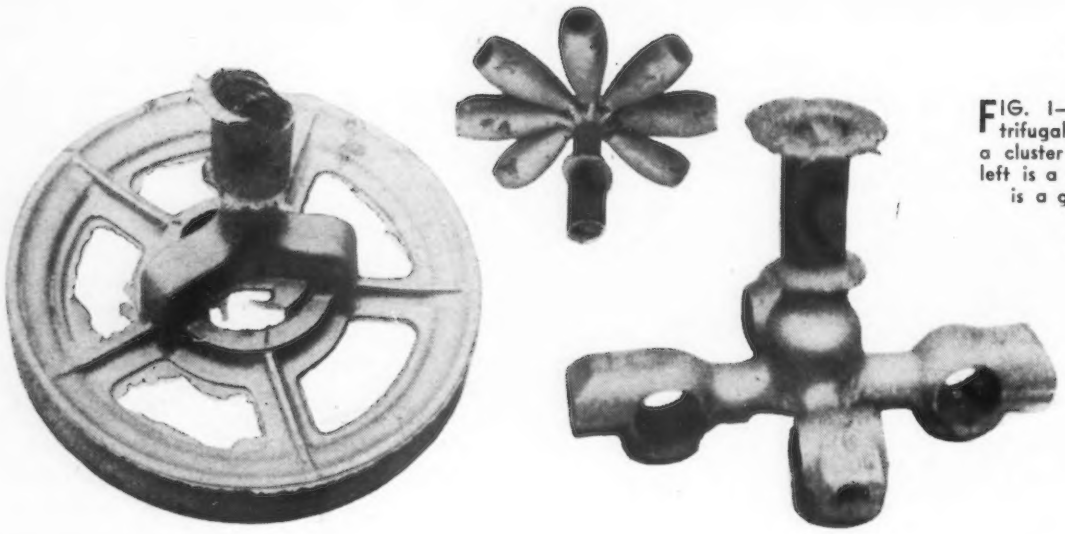

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FIG. 1—Several types of centrifugal castings. Top center is a cluster of mortar shells, lower left is a sheave and lower right is a group of valve parts.

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casting, is nearing completion and will soon be available.

It should be pointed out at this point that castings which are known as "commercially sound" are frequently not adequate for aircraft use. Castings used in aircraft must be as close to perfect as it is humanly possible to produce them due to the low factor of safety used in aircraft design. Centerline weakness or porosity cannot be tolerated. Close control of chemical analysis along with heat treatment are imperative to assure dependability of performance.

Fig. 1 illustrates several types of centrifugal castings. At top center is a cluster of mortar shells produced by the pressure method. At lower left is a sheave made by the semi-centrifugal method, while at the lower right are valve parts made by the pressure method.

True centrifugal castings, Fig. 2, are castings which are produced by spinning about their own axis, as for example, cylinders without a center core. With a mold of given bore, the size of the internal diameter of the cylinder is determined by the amount of metal poured into the mold.

The important consideration in this type of casting is that the cooling takes place in only one direction, from the outside toward the center of rotation.

Castings of this type can be made by spinning them about either a vertical or horizontal axis. Generally speaking, when producing castings spun about a vertical axis, the length of the cylinder should not greatly exceed the diameter. If longer cylinders are produced, excessive taper of the diameter will result, as shown by the following formula:

$$N = \left(264 \sqrt{\frac{1}{r_1^2 - r_2^2}}\right)\left(\sqrt{\frac{2}{H}}\right)$$

Where N = r.p.m., r_1 = inside radius at top in inches, r_2 = inside radius at bottom in inches, and H = height in inches.

As an example of this type of calculation, refer to Fig. 3. It is desired to find the proper speed to centrifugally cast the cylinder illustrated here having an inside diameter of 8 in. at the top and 7¾ in. at the bottom, with a heighth of 8 in. From the above formula, the calculated speed (N) would be 744 r.p.m., or equivalent to a peripheral velocity of 1500 ft. per min.

It has been found in actual practice that the amount of taper of the casting cannot be materially reduced by rotating at speeds over 1500 ft. per min., peripheral velocity. The type of metal poured, its viscosity and pouring temperature will also effect the amount of taper, causing some deviation from the formula. The actual taper will generally be somewhat greater than that calculated.

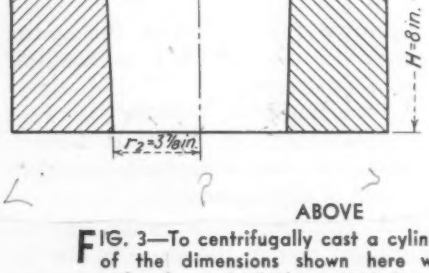
When producing long cylindrical castings, horizontal machines should be used. Examples of the type of machine best suited for specified jobs are as follows:

Vertical Machines

Bronze bearings of various sizes and types.

Bushings for piston rings.

Rings, flanges, bushings, etc.



ABOVE

FIG. 3—To centrifugally cast a cylinder with a taper of the dimensions shown here would require a peripheral speed of about 1500 ft. per min., according to the formula discussed in this article.

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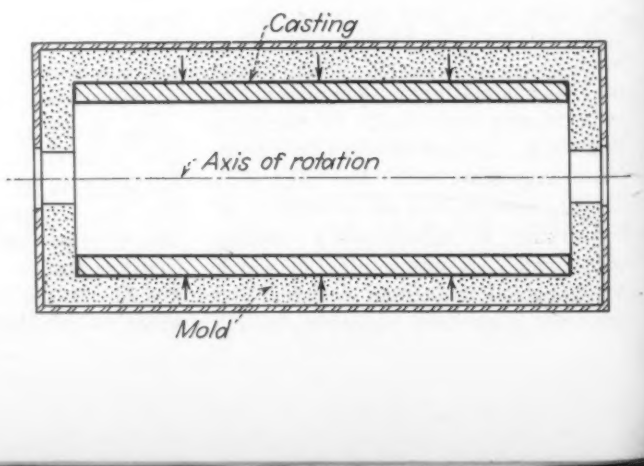

RIGHT

FIG. 2—An example of a true centrifugal casting, a cylinder produced by spinning about its own axis.

Horizontal Machines

Pipe.
Cylinders for aircraft engines.
Cylinder liners.
Alloy tubes of various metals.
Bushings.

Semi-centrifugal castings are castings which are not necessarily round or cylindrical in shape and are spun about their own axis, as shown in Fig. 4. This kind of centrifugal casting may be made with or without a gate. In this type of casting, the direction of cooling is not unidirectional, as the mold surface is in contact with practically all surfaces of the castings.

To obtain perfect castings of this type it is necessary to insure that directional solidification takes place from the maximum outside diameter of the casting toward the center. When this takes place, each section of the casting will be fed during its period of solidification by the molten metal immediately adjacent and nearer the center of rotation. In order to accomplish this it is sometimes necessary to resort to the use of pads, auxiliary gates or chills. Examples of this type of casting are gear blanks, flywheels and brake drums.

Pressure casting or centrifuging has the widest field of application as it can be used to make castings of a wide range of configurations. With this method the individual castings are arranged about the center of rotation and around a central downgate. Side gates are used to feed each individual casting.

The down gate and side gates serve three purposes: (1) They provide a passageway in the mold for filling the mold cavity with molten metal; (2) they must be large enough to feed molten metal into the castings during the period of solidification, and (3) they must be large enough to contain a sufficient amount of molten metal to replace the volumetric shrinkage of the metal during the period of solidification.

The principal consideration behind the gating of this type of casting is to obtain directional solidification from the maximum outside diameter of the mold, toward the center, including the side gates. Examples of this type of casting are valve bodies, miscellaneous valve parts and a wide variety of irregularly shaped parts.

In static casting there is one degree of freedom, with respect to the movement of the molten metal, that is vertical. The mold fills from the bottom progressively to the top. With the centrifuging method, two degrees of freedom are available. By controlling the speed of rotation, the mold can be filled with metal from the outside, or largest diameter, toward the center of rotation, or from the bottom of the mold up to the top.

By suitable adjustment of the speed of rotation during the pouring period, any variation between these two methods of filling the mold can be obtained. Greater control of the distribution of the metal during the pouring operation, and thus, greater overall control, can be had. Because of the greater amount of control true directional solidification may be obtained.

It should be borne in mind that the first metal entering the mold is the coldest, while the last metal in is the hottest. The first metal entering the mold is cooled by contact with the cold mold walls. As the pouring continues, the walls of the mold used for the gates are heated so that the metal

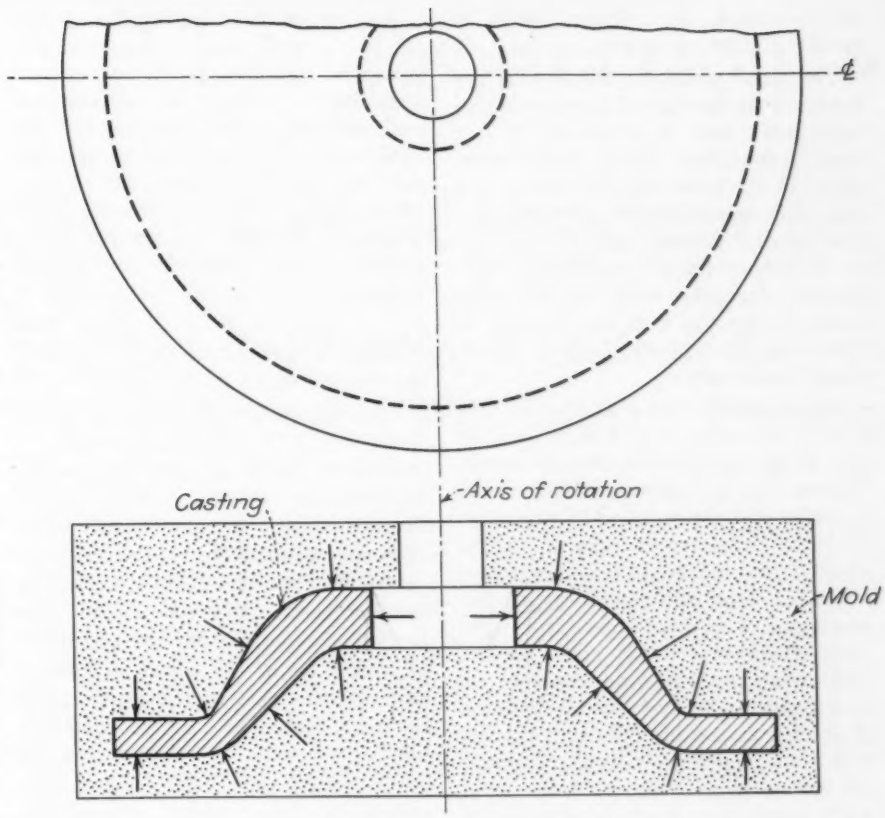

FIG. 4—Castings similar to that illustrated here, which are not necessarily round or cylindrical but which are spun about their own axes are termed semi-centrifugal castings. Arrows show direction of cooling.

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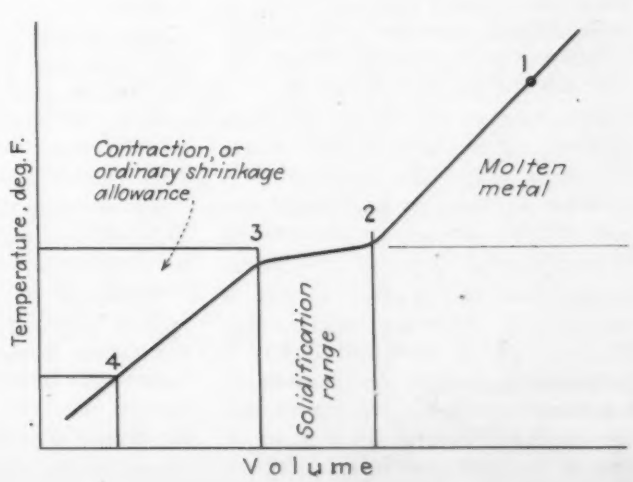

FIG. 5 — Changes in volume resulting during the transition of a metal from the liquid state to a solid.

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being poured at a later period is cooled to a lesser extent.

The last metal in ultimately remains in the preheated down gate and side gates and is subjected to the least precooling. Thus, the hottest metal in the mold is in the down gate and side gates which are used for feeding the casting proper. This is a highly desirable condition. This control, together with the pressure produced by the rotation, assists in obtaining the much desired directional solidification.

When molten metal is poured into a mold at point (1), Fig. 5, cooling and some reduction in volume occur. During this period the molten metal is cooled and the mold walls are heated. The reduction in volume of the metal from (1) to (2) in itself has no effect upon the soundness of the castings. The heat lost from the metal from (1) to (2) heats up the mold walls and retards the rate of solidification. Many types of castings, if poured at too high a temperature, will have shrinkage porosity because the excessive preheating of the mold walls upsets the pattern of directional solidification.

The period of solidification of (2) to (3) is the principal concern and worry of foundrymen. It is at this time that the liquid metal solidifies and becomes a solid. During this period there is a reduction in the specific volume of the metal. If no provision is made to add additional metal while this shrinkage is taking place, shrink voids, porosity, centerline weakness, etc., occur. To obtain a perfect casting, it is essential that each section of a casting be fed during the period of solidification.

The contraction of the cast metal from (3) to (4) during the period of cooling to room temperature is important. The extent of this contraction determines the shrink rule to be used in making the pattern equipment. The use of a ¼-in. shrink rule for one metal and ⅛-in. shrink rule for another means that the coefficient of expansion of the metal is greater and that the pattern equipment must be made larger so that the castings will contract to the desired size at room temperature. The coefficient of expansion (the shrink rule) tells nothing regarding the castability of the metal and its sensitivity to shrinkage porosity, but it is a measure of its tendency toward cracking during the casting operation.

A pure metal solidifies at constant temperature. Steel, which has less carbon than cast iron, is purer than the latter and, thus, is more difficult to cast perfectly. It is readily realized that for many metals it is necessary to do all of the feeding during the very short period of time the molten metal is solidifying. Any method of centrifugal casting supplies, in addition to static feeding pressure, pressure due to centrifugal force. This is many times that of the static pressure available and can take care of the necessary feeding action quickly, thus producing perfect castings.

No mention has been made of bad centrifugal castings. It is just as easy to make bad centrifugal castings as it is to make good ones. There are many details of gating, molding, etc., which must be understood in order to produce perfect centrifugal casting without excessive experimentation. This information can be gained only by study and experimentation.

Gas Holes in Brass Castings

AN interesting discussion of the causes of gas holes in limited areas in brass castings featured a non-ferrous scrap clinic held during the recent foundry conference sponsored by the Wisconsin Chapter of AFA and the University of Wisconsin. The clinic discussion was led by A. K. Higgins, Allis-Chalmers Mfg. Co., and W. Edens, Ampco Metal, Inc.

Higgins exhibited portions of castings scrapped because of such gas holes. He related how the cause of these defects had been traced to absorption of gas by the metal as it ran over the surface of a thin core.

This core, it was found, had been partially saturated with wax from a wax core vent. This resulted in a decrease in the permeability of the core and an increase in the amount of gas formed by the core on heating.

As a check on the effects of wax in the cores, the following test was run, Higgins reported. Standard AFA sand permeability samples were made of the same sand mix. The top of one specimen was covered by a layer of wax in the core that caused the defect. A second sample was made up without wax. Both samples were baked for 2 hr. at 420 deg. F. The permeability of the sand was measured after baking with the following results: The core without wax had a permeability of 140 AFA, while the core with wax showed a permeability of 77 AFA.

On washing the wax impregnated core with organic solvents most of the wax was found to be present and unaltered.

The conclusion drawn from this test was that the presence of wax in amounts of more than 4 to 7 per cent of the volume of the core could be detrimental unless very open sands were used.

The castings which gave rise to the investigation were made successfully by eliminating vents completely.

Causes of surface pinholes in aluminum bronze were also debated at the clinic. While no definite conclusions were arrived at, the general opinion was that the pinholes were the result of some contamination of ingot metal. Several remeltings of the faulty metal were found to eliminate the trouble.

The use of excessive moisture in the molding sand was also suggested as a contributing cause. This pinhole defect was reported to be less prevalent in recent months, presumably because of greater care being exercised in the selection of raw material and more experience with melting and alloying this metal.

Shifts in green sand molds also received attention at the clinic. Flexure of the sides of an improperly supported flask was said to be likely to result in a movement of the sand within the mold which causes not only a shifted casting, but actual deformation and dimensional changes in the mold cavity.

Trouble due to this defect can be remedied or reduced, it was concluded, by the use of stiffer flasks and by more careful support of the cope during roll-over. Where extreme accuracy is required, it was suggested that it may be desirable to lift the cope directly from the pattern and to pull loose pieces and apply blacking, etc., without turning the cope over.

AFA Production Conference

. . . 47th Annual Meeting at St. Louis Is Dedicated to War Castings Problems

"WHAT the Navy wants and expects from the foundry industry is quantity, speed and quality."

That was the challenge thrown to the foundrymen of the nation by Rear Admiral G. W. Pettengill in an address at the 1942 meeting of the American Foundrymen's Association, five months after Pearl Harbor.

And the records prove that the industry, not without its share of groans and creekings, met that challenge well and the Navy, as well as other castings users, did receive its castings with quantity, quality and speed far beyond any reasonable expectation existing in April of 1942.

Yet, such is the nature of war that the best is never good enough and the industry is again being asked to exceed its past accomplishments. As part of the united effort of foundrymen to meet this demand, the purpose of this year's meeting of the American Foundrymen's Association, its 47th annual gathering, is the development of better, faster and higher casting production.

The 1943 war production conference of AFA has been compressed into three fact-packed days—April 28, 29 and 30. St. Louis is the host for this year's gathering, with headquarters and most of the technical sessions scheduled to be held at the Hotel Jefferson.

A study of the technical papers listed on the appended program of the meeting reveals a wide and practical coverage of quality and quantity problems.

This year also marks the appearance of the newly formed aluminum and magnesium division of the association. The division has prepared a very worth while program for the meeting.

Another outstanding feature of the meeting will be the symposium on cast iron as engineering material. This symposium is designed to present information on the latest specifications and testing methods and to show the many possible applications of various types of iron castings.

Malleable founders will probably find the symposium on melting practices of unusual value. These sessions will cover, among other subjects, pulverized coal fired air furnaces, melting with fuel oil, air furnace-cupola duplexing, cupola-electric duplexing and refractory practice.

The gray iron division is sponsoring a three-session shop course dealing largely with cupola operation.

Another special feature will be a series of lectures on gating and heading to be given by W. G. Reichert, foundry consultant, of Newark.

The first AFA foundation lecture, a new feature of the annual convention, will be delivered by J. W. Bolton, Lunkenheimer Co., whose subject will be "Foundry Metallurgy in the Casting Industry."

The annual meeting on Wednesday will also include the presentation of awards, for outstanding service to the foundry industry, to R. F. Harrington, Carl F. Joseph and S. W. Brinson.

The annual dinner on Friday will feature as speakers D. P. Griswold, governor of Nebraska, and Lieut. Colonel J. M. Colby, chief of development branch, tank-automotive center, Ordnance Department. Mr. Griswold will speak on "Industry Fights a War" and Colonel Colby will discuss "Performance of American Tanks on the Battlefield."

These features are merely a few of the highlights of the conference. A study of the appended program will show many opportunities for a foundryman to learn of ways to improve foundry technique. The program is subject to minor changes.

Program of AFA War Production Conferei

WEDNESDAY

10:00 A. M.

Opening Session of Conference.
Presiding — D. P. Forbes, president, AFA; Vice-Chairman—L. C. Wilson, vice-president, AFA.
Annual president's address.
Trends in the Use of Ordnance Items, address by Col. Merle H. Davis, chief, St. Louis Ordnance District.

12:30 P. M.

Malleable Division Round Table Luncheon.
Presiding—A. M. Fulton, Northern Malleable Iron Co., St. Paul, Minn. Co-Chairman—R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.
Discussion, "*Information Please.*"
Discussion leader—J. H. Lansing, Malleable Founders Society.

2:00 P. M.

Aluminum and Magnesium Founding.
Presiding — N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.
Recommended Practices for Magnesium Foundry Alloys—Committee report.
Chemical Analyses of Sands for Magnesium Castings, by E. W. Cramer, Washington State College, Mining Experiment Station, Pullman, Wash.
Temperatures Developed in Sand Cores During Casting of Magnesium Alloys, by A. T. Peters and M. V. Chamberlin, Dow Chemical Co., Midland, Mich.

Molding and Coremaking.
Presiding—M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.
Core Blowing, by Z. Madacey, Caterpillar Tractor Co., Peoria, Ill.
Application of Modern Controlled Methods to Produce Heavy Gray Iron Castings, by Samuel Appelby, Buffalo Foundry & Machine Co., Buffalo.

Foundry Costs.
Presiding — R. L. Lee, Grede

Foundries, Inc., Milwaukee. Co-Chairman — John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.

Round Table Discussion of Explanation of Principles for Determining Costs Under Government Contracts—Panel leaders, members of AFA cost committee.

Report on Review of Recommendations to Buyers of Castings, by C. A. Davis, Caterpillar Tractor Co., Peoria, Ill.

4:00 P. M.

Heading and Gating Castings.

Aluminum and Magnesium Casting Practice, lecture by W. G. Reichert, Newark, N. J.

Job Evaluation and Time Study.

Presiding — Frank Wartgow, American Steel Foundries, East Chicago, Ind.; Co-Chairman—W. E. George, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; Secretary — C. E. Rowe, MacDonald Bros., Inc., Chicago.

Time Study and Job Evaluation as Applied to the Foundry—Panel discussion. Panel leaders: E. L. Berry, Link-Belt Co., Chicago; E. J. Metzger, Falcon Bronze Co., Youngstown; J. A. Westover, Dyer Engineers, Inc., Cleveland; R. J. Wieland, Forest City Foundry Co., Cleveland; L. W. Wallis, Trundle Engineering Co., Cleveland.

Gray Iron.

Presiding—F. J. Walls, International Nickel Co., Detroit. Vice-Chairman — Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

Cupola Combustion, by W. Pennington, Mellon Institute, Pittsburgh.

The Effect of Heat Treatment on the Physical Properties of Some Common Irons Used in Oil Field Equipment, by E. R. Starkweather, Lufkin Foundry Co., Lufkin, Tex.

Review of Spanish Investigations of Gray Iron Metallurgy, by F. R. Morral, Pennsylvania State College, State College, Pa.

4:30 P. M.

Chapter delegate meeting.

Presiding — L. C. Wilson, vice-president, AFA; Vice-Chairman — R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

6:30 P. M.

Annual Dinner — Foundry instructors in engineering schools.

Presiding—F. G. Sefing, International Nickel Co., New York.

Education and the Gray Iron Foundry, by W. W. Rose, executive vice-president, Gray Iron Founders Society.

Annual Dinner, chapter officers and directors.

Presiding — L. C. Wilson, vice-president, AFA; Vice-Chairman — R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

A.F.A. PRESIDENT

D. P. Forbes of Gunite Foundries Corp., Rockford, Ill.

8:00 P. M.

Sand Shop Course.

Presiding—F. S. Brewster, Dow Chemical Co., Midland, Mich.

Foundry Sands for Magnesium and Aluminum Castings—panel discussion. Panel leaders—W. F. Rose, Wright Aeronautical Corp., Paterson, N. J.; A. E. Cartwright, Robert Mitchell Co., Ltd., Montreal; M. E. Gantz, American Magnesium Corp., Cleveland; F. S. Brewster, Dow Chemical Co., Midland, Mich.

Gray Iron Shop Control.

Presiding — Kenneth Priestley, Eaton Mfg. Co., Vassar, Mich.; vice-chairman — E. E. Marbaker, Pittsburgh, Pa.

Slags, Fluxes and Desulphurizers—Discussion leader, George S. Evans, Mathieson Alkali Works, New York.

Special War Problems.

Presiding — W. J. Hebard, director of personnel, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Training Women for Industry, by Miss Sarah Southall, supervisor of employment, International Harvester Co., Chicago, and consultant, WMC.

THURSDAY

9:30 A. M.

Business and Awards Meeting.

Presiding — D. P. Forbes, president, AFA; vice-chairman—L. C. Wilson, vice-president, AFA.

Report of officers.

Report of election of officers.

Election of 1944 Nominating Committee.

Medal Awards.

First AFA Foundation Lecture—*Foundry Metallurgy in the Castings Industry*, by John W. Bolton, Lunkenheimer Co., Cincinnati.

12:30 P. M.

Aluminum and Magnesium Division —Round table meeting.

Presiding — N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.; vice-chairman — Leslie Brown, Magnesium Fabricators, Adrian, Mich.

Discussion leaders—A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.; G. H. Starmann, Apex Smelting Co., Chicago.

Fire Prevention and Control in Magnesium Foundries, by R. I. Thrune, Dow Chemical Co., Midland, Mich.

2:00 P. M.

Malleable Foundry Melting Symposium—Section 1.

Presiding—D. P. Forbes, president, AFA; co-chairman—Carl F. Joseph, Saginaw Malleable Iron Co., Saginaw, Mich.

Introduction by H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

Air Furnace — Pulverized Coal Fired, by J. A. Durr, Eastern Malleable Iron Co., Naugatuck, Conn.

Melting with Fuel Oil in the Air Furnace, by A. Van Lantschoot, Iowa Malleable Iron Co., Fairfield, Iowa.

Patternmaking.

Presiding—Vaughan Reid, City Pattern Works, Detroit; co-chairman — Frank C. Cech, Cleveland Trade School, Cleveland.

Job Analysis and Predetermining of Time Values for Patternmaking, by W. D. Walters, supervisor of time study, Feeder Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Insurance Protection of Patterns, by W. C. Anderson, Missouri Inspection Bureau, St. Louis.

Metallizing as a Pattern Tool, by E. T. Parkinson, Metallizing Co., Chicago.

Report on Pattern Coatings.

Steel Castings.

Presiding—R. A. Gezelius, General Steel Castings Corp.; co-chairman — John Howe Hall, General Steel Castings, Eddystone, Pa.

Heat Treatment of Medium Carbon Cast Steel in Moderately Heavy Sections, by K. L. Clark and H. F. Taylor, Naval Research Laboratory, Anacostia Station, Washington, D. C.

Quantity Production of Manganese Steel, by J. W. Gardom, Sheffield, England, Exchange Paper of Institute of British Foundrymen.

Report of Committee on Radiography, presented by C. W. Briggs, Steel Founders Society of America.

A.F.A. VICE-PRESIDENT
L. C. Wilson, Reading Steel Casting Division of American Chain & Cable Co., Reading, Pa.

Symposium on Gray Cast Iron as an Engineering Material—(1st Section).

Presiding—Dr. A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J., and War Metallurgy Committee, National Research Council, Washington, D. C.; vice-chairman—T. E. Barlow, Vanadium Corp. of America, Detroit.

Introduction of Symposium, by R. G. McElwee, Vanadium Corp. of America, Detroit, and War Production Board, Washington, D. C.

Report of Survey of High Temperature Properties and Applications, by T. E. Barlow, War Metallurgy Committee and Vanadium Corp. of America, Detroit.

Heat Treatment of Cast Iron, by J. S. Vanick, International Nickel Co., New York.

4:00 P. M.

Heading and Gating Castings.

Heading Iron Castings — lecture by W. G. Reichert.

Brass and Bronze Founding.

Presiding — W. Romanoff, H. Kramer & Co., Chicago; vice-chairman—W. W. Edens, Ampco Metals, Inc., Milwaukee.

Recommended Practice for Manganese Bronze—Committee report.

Effect of Lead on Some of the Mechanical Properties of Manganese Bronze, by George Halliwell, H. Kramer & Co., Chicago.

Lead in Manganese Bronze, by A. H. Hesse, Naval Research Laboratory, Anacostia Station.

Melting Malleable Iron — Symposium (Section 2).

Presiding—H. A. Schwartz, National Malleable & Steel Castings, Cleveland; co-chairman—R. J. Anderson, Belle City Malleable Iron Co., Buffalo.

Air Furnace—Cupola Duplexing, by F. J. Wurscher, Acme Steel & Malleable Co., Buffalo.

Cupola—Electric Duplexing, by Charles Morrison, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.

Cupola Melting for Malleable Fittings, by H. W. Maack, Crane Co., Chicago.

Open Hearth Melting, by Leo J. Kelly, Fort Pitt Malleable Iron Co., Pittsburgh.

6:30 P. M.

Foundry Foremen Training Group —Dinner.

8:00 P. M.

Foreman Training.

Presiding — W. G. Conner, Jr., Walworth Co., Washington Park, Ill.; vice-chairman—W. E. George, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.

Panel Discussion — Foreman Training.

Job Relations Training by Training Within Industry Division, WMC.

Sand Control Shop Course.

Presiding — E. E. Woodliff, Detroit.

Cement Molding Practices in a Gray Iron Shop, by C. Sleicher, New England Butt Co., Providence, R. I.

Gray Iron Shop Course.

Presiding — P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.; vice-chairman—E. E. Marbaker, Pittsburgh.

Carbon Control of Cupola Cast Iron — Discussion leader, H. Kenneth Briggs, Miller & Co., Chicago.

Front Slagging Spout for Cupolas, by R. D. Petcher, Weil McLain Co., Michigan City, Ind.

Melting Malleable Iron—Symposium (Section 3).

Presiding—C. F. Joseph, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.; co-chairman — J. H. Lansing, Malleable Founders' Society.

Bracklesburg Furnace Melting, by W. Zeunik and Kenneth Mason, National Malleable & Steel Castings Co., Indianapolis.

Refractories Practices for Malleable Furnaces, by C. A. Brashares, Harbison-Walker Refractories Co., Pittsburgh.

Practical Points in Malleable Melting, by J. H. Lansing, Malleable Founders' Society.

Aluminum and Magnesium Castings

Presiding — N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.

Recommended Practice for Sand Cast Aluminum Alloys—Committee report by H. J. Rowe, Aluminum Co. of America, Cleveland.

Fluoroscopic Examination of Light Alloy Castings, by A. E. Cartwright, Robert Mitchell, Co., Ltd., Montreal.

Recent Improvements in Magnesium Melting and Aluminum Ladle Preheating Practice, by James Kniveton, Selas Co., Philadelphia.

Steel Castings.

Cores for Steel Castings, by J. A. Duma and S. W. Brinson, Norfolk Navy Yard, Portsmouth, Va.

Converter Practice, by F. H. Skeates, Link-Belt Co., Chicago, and A. W. Gregg, Whiting Corp., Harvey, Ill.

J. W. BOLTON
Lunkenheimer Co., First A.F.A. Foundation Lecturer.

FRIDAY

10:00 A. M.

Steel Castings.

Presiding—C. E. Sims, Battelle Memorial Institute, Columbus, Ohio; co-chairman — C. W. Briggs, Steel Founders' Society of America.

Use of Aluminum in 1000 Steel Heats, by E. C. Troy, Dodge Steel Co., Philadelphia.

Report of Committee on Non-Destructive Testing—by Committee chairman R. A. Gezelius, General Steel Castings Co., Eddystone, Pa.

Report of Committee on Methods or Producing Steel for Castings—by Committee chairman E. Sims, Battelle Memorial Institute, Columbus, Ohio.

Brass and Bronze.

Presiding—H. M. St. John, Crane Co., Chicago.

Recommended Practices for Aluminum Bronze—Committee re-

port by A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee.

Recommended Practices for Silicon Bronzes—Committee report by E. G. Jennings.

Centrifugal Castings of Brass and Bronze, by H. Quehlke, Allis-Chalmers Mfg. Co., Milwaukee.

Apprentice Training.

Presiding — C. J. Freund, Dean of Engineering, University of Detroit, Detroit.

The Second Generation in Apprentice Training, by Richard Falk, Falk Corp., Milwaukee.

Getting Results from Accelerated Training, by W. J. Hebard, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Sand Research.

Presiding—J. B. Caine, Sawbrook Steel Castings Co., Lockland, Ohio; vice-chairman — Dr. H. Ries, Ithaca, N. Y.

Elevated Temperature Studies of Foundry Cores and Coremaking Materials, by C. P. Albus and Emile Pragoff, Jr., Hercules Powder Co., Wilmington, Del.

Southern Bentonite in the Steel Foundry by N. J. Dunbeck, Eastern Clay Products Co., Eifort, O.

Causes of Burned-in Sand Condition of Steel Castings, by J. B. Caine, Sawbrook Steel Castings Co., Lockland, O.

Cast Iron.

Symposium on cast iron as an engineering material (Section 2)

Presiding—V. A. Crosby, Climax Molybdenum Co., Detroit; vice-chairman — George A. Timmons, Climax Molybdenum Co., Detroit.

Modulus of Elasticity, by A. J. Herzig, Climax Molybdenum Co., Detroit.

Impact Properties, by Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham.

Endurance Limits, by C. J. Tobin, General Motors Research Laboratories, Detroit.

Vibration Dampening, by F. J. Walls, International Nickel Co., Detroit.

12:30 P. M.

Steel division round table luncheon.

Presiding—T. D. West, Deere & Co., Moline, Ill.

Atmospheric Pressures in Blind Feed Risers—Chairman—R. S. Munson, Atlantic Steel Casting Co., Chester, Pa. Discussion leader—H. D. Phillips, Lebanon Steel Foundry Co., Lebanon, Pa.

Some "Good and Bad Castings"—Chairman — A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn. Discussion leader — S. W. Brinson, Norfolk Navy Yard, Portsmouth, Va.

Miscellaneous Topics.

Discussion leaders — John Howe Hall, General Steel Castings Corp., Eddystone, Pa., and G. A. Lilliequist, American Steel Foundries, East Chicago, Ind.

Brass and bronze division round table luncheon.

Presiding — B. A. Miller, Camp Brass & Iron Foundries Division, Baldwin Locomotive Co., Philadelphia.

Recommended Practice for Temperature Control, by Frank O'Connor, Walworth Co., Greensburg, Pa.

Apprentice Committee Meeting and Luncheon.

2:00 P. M.

Safety and Hygiene Section.

Presiding—James R. Allan, International Harvester Co., Chicago.

Fumes and Dust—discussion by Dr. E. M. Adams, Dow Chemical Co., Midland, Mich.

Mechanical Exhaustion of Fumes and Smoke in Non-Ferrous Foundries and Industrial Operations, by John Kane, American Air Filter Co., Louisville, Ky.

Medical Aspects of Safety and Hygiene Problems in Magnesium and other Foundries, by Warren Cook, Zurich General Accident & Liability Insurance Co., Ltd., Chicago.

Question and Answer Period — Occupational disease problems.

Foundry Refractories.

Presiding—J. A. Bowers, American Cast Iron Pipe Co., Birmingham; vice-chairman — John Lowe, Battelle Memorial Institute, Columbus, O.

Conservation of Foundry Refractories, by F. McCarthy and C. E. Bales, Ironton Fire Brick Co., Ironton, O.

Electric Furnace Refractories, by E. K. Pryor, Charles Taylor & Sons, Cincinnati.

Report of Cupola Refractories, by committee of cupola research project.

Cast Iron.

Symposium on Gray Cast Iron as an Engineering Material (Section 3)

Presiding — John W. Bolton, Lunkenheimer Co., Cincinnati; vice-chairman — John Lowe, Battelle Memorial Institute, Columbus, O.

Relation of Microstructure to Properties, by W. E. Mahin, Westinghouse Electric & Mfg. Co., Pittsburgh.

Compression and Torsion Properties, by F. G. Sefing and J. S. Vanick, International Nickel Co., New York.

Wear Resistance, by Paul Lane, Muskegon Piston Ring Co., Muskegon, Mich.

Transverse and Tension Strength and Deflection, by F. J. Walls, International Nickel Co., Detroit.

Closure of Symposium, by R. G. McElwee, Vanadium Corp. of America, Detroit.

Quick Index to AFA Technical Sessions
(Consult complete program for details)

	Gray Iron	Steel	Malleable	Aluminum and Magnesium	Brass and Bronze	Training Programs	Time Study and Costing
Wednesday 12:30 P.M.			X				
2:00 P.M.	X			X			X
4:00 P.M.	X			X			X
8:00 P.M.	X			X		X	
Thursday 12:30 P.M.				X			
2:00 P.M.	X	X	X				X
4:00 P.M.	X		X		X		
8:00 P.M.	X	X	X	X			X
Friday 10:00 A.M.	X	X			X	X	
12:30 P.M.		X			X		
2:00 P.M.	X			X			
4:00 P.M.		X					
7:00 P.M.	X	X					

4:00 P. M.

Heading and Gating Castings.
Lecturer—W. G. Reichert, Newark, N. J.

Plant and Plant Equipment.
Presiding—James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Infra Red Lamp Drying of Cores and Molds — Symposium with papers by: L. M. Duryee, Connecticut Light & Power Co., Waterbury, Conn.; E. H. Robinson, Lamp Dept., Nela Park Engineering Dept., General Electric Co., Cleveland.

Core Sand Reclamation at Elevated Temperatures, by D. Longeuville, Wright Aeronautical Corp., Cincinnati, O., and W. L. Hartley, Link Belt Co., Chicago.

Discussion of Steel Foundry Maintenance Under War Time Conditions.

Steel Foundry Practice.
Presiding—F. A. Melmoth, Detroit Steel Castings Co., Detroit; vice-chairman—L. Farquhar, American Steel Foundries, East St. Louis, Ill.

Stress Relief and the Steel Casting, by H. F. Taylor and E. Rominski, Naval Research Laboratory, Anacostia Station, Washington, D. C.

Hydrogen and Nitrogen as Causes of Gasiness in Ferrous Castings, by C. A. Zapffe and C. E. Sims, Battelle Memorial Institute, Columbus, O.

Factors Influencing Ductility in Cast Steel, by G. A. Timmons, Climax Molybdenum Co., Detroit.

7:00 P. M.

Annual Dinner — American Foundrymen's Association.
Presiding—D. P. Forbes, president, AFA.

Steel Shop Sand Control.
Presiding — F. B. Riggan, Key Co., East St. Louis, Ill.

Gray Iron Shop Control.
Presiding—H. H. Wilder, Washington, D. C.

Cupola Operation — Discussion leader—E. E. Marbaker, Mellon Institute, Pittsburgh.

Quench-Time Control for Cast Armor

By J. P. VOLLRATH

Application Engineering Staff, Brown Instrument Division, Minneapolis-Honeywell Regulator Co.

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A NEW system of water quench-time control has been developed by the Brown Instrument Co. and is now in successful operation at two of the country's largest plants producing cast steel armor plate. The Brown system provides accurate, automatic control of the time the casting is in the quenching bath. In this operation timing is a vital factor because quenching is used to develop the extremely hard surface required in certain types of armor and immersion for too long or too short a period would affect the metallurgical properties of the casting.

Brown engineers worked out the quenching method in developing a complete system of program control for the plants mentioned. This control system includes more than 50 zones of electric proportioning control and automatic reset for normalizing and drawing furnaces. These two installations use overhead, conveyor-type continuous furnaces in which the work is carried through on a carefully planned time schedule. However, it is a simple matter to modify this basic system to meet individual plant requirements.

As the schematic drawing shows, the heated part on emerging from the final zone of the normalizing furnace is pushed along the conveyor until it reaches a detachable section of the rail. This section is raised and lowered by a pneumatic power cylinder. When the conveyor is run onto the separate rail, limit switch No. 1 closes and simultaneously energizes the holding-in relay, three-way solenoid valve and the timing controller. Compressed air enters the pneumatic cylinder through one of the air-operated three-way valves and the heated work is lowered into the quench tank. As soon as the pre-set immersion period has ended, the system reverses itself. The timer de-energizes the three-way valve and the pneumatic cylinder goes into reverse, thus raising the quenched parts.

When the detachable track section is back in place, the conveyor is pulled manually toward the draw furnace. As the conveyor wheels pass under limit switch No. 2 this switch, normally closed, breaks momentarily and resets the timing mechanism. Limit switch No. 2 is located at least one and a half track sections beyond the detachable rail so that the conveyor will be safely away from switch No. 1 before the timer is reset.

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BROWN quenching time and temperature control system for quenching cast steel armor.

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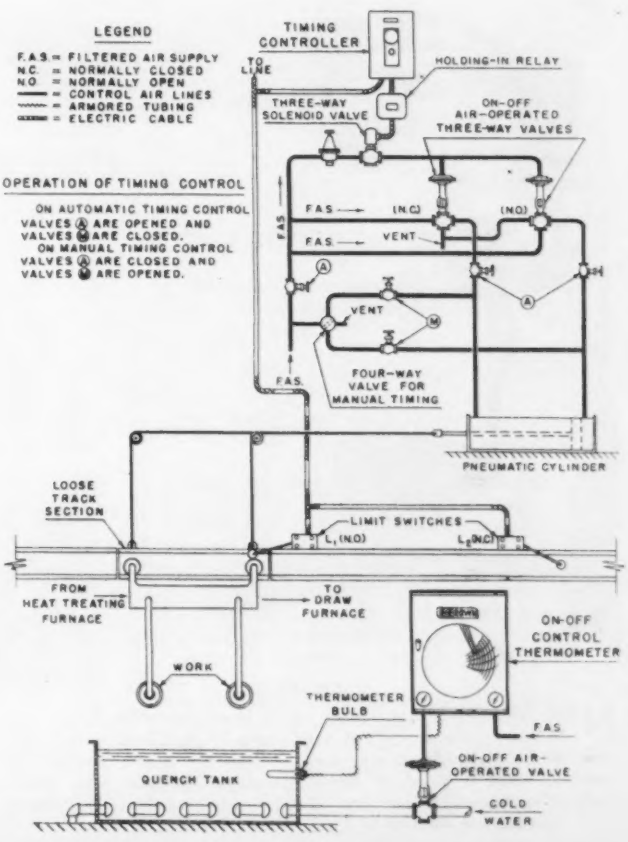
Because the temperature of the quenching bath is a critical factor, the installation also includes a two-position thermometer control for the quench tank. This instrument automatically controls the quantity of water flowing through the heat exchanger coils to maintain the desired bath temperatures. Indicating or recording instruments are recommended because of the accuracy required in controlling quench bath temperatures for this class of work. However, on other classes of work, non-indicating thermometers are sometimes used.



Underwater Resistance Welding of Stranded Wire

AT the East Pittsburgh works of the Westinghouse Electric & Mfg. Co. underwater resistance welding has replaced many of the routine processes of soldering or brazing of stranded copper cable to terminals. This modification of a standard welding process has saved considerably in production costs by raising output and improving the quality of finished products.

Essentially, the process consists of welding by means of special tips while playing a stream of water on the stranded wire near the electrode. Water is applied in a volume sufficient to cool the work and prevent oxidation at the weld.

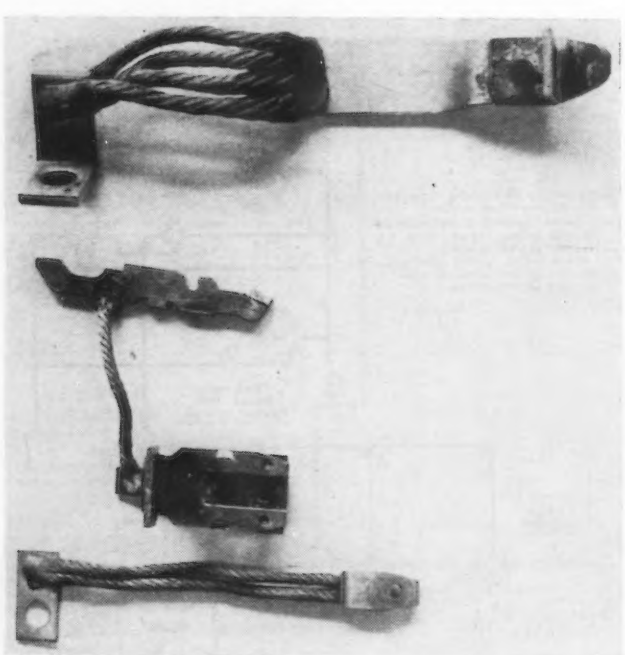
Spot welding machines used for this work are usually designed with a special jig fastened around the stationary electrode to hold the parts firmly in their relative welding positions. Electrode tips as now used are made of carbon, molybdenum and cupaloy. Increased tip life is obtained by mounting them in watercooled holders. For welds that do not require flux, cupaloy tips with molybdenum inserts have been found most satisfactory. Carbon tips are required where flux is used. Inserts that contact the wire are grooved to prevent flattening the cable.

By means of a foot pedal, the operator initiates the lowering of the upper electrode to complete the weld. The machine is air operated and is timed by electronic controls which insure a quality weld. The completed assembly may be removed immediately without the use of pliers or gloves.

One of the illustrations shows typical welds made by this new process. With time values based on a 60 cycle line frequency, the technical data for upper end of left hand assembly are as follows: 2352 strands of 0.002 in. wire welded to 0.037 in. thickness of copper. Time 38 cycles, current 14,400 amp., 400 lb. electrode pressure. Cupaloy tips with molybdenum inserts are used on both top and bottom. The lower end of the same assembly has the wire welded to two pieces of 0.020 in. thickness of tinned copper. Time required was 26 cycles with current of 14,400 amp. and 400 lb. electrode pressure. Flat surface tips used on both molybdenum inserts. Both current and time are proportional to the size of the weld.

This job, formerly a hand operation, is now a line production operation. Cost of production has decreased and quality and appearance of the completed parts has been improved.

A noticeable comparison in completed assemblies by the old and new methods is that the wire cables remain flexible to the point of weld in the underwater resistance weld. In either the soldering or the brazing process molten metal is drawn into the hot cable by capillary action and diminishes the flexibility of the cable. Cooling the parts with water not only makes handling easier but heat is removed from immediate area of the weld rather than passing to more distant areas. Thus the original properties of the individual parts are not changed.

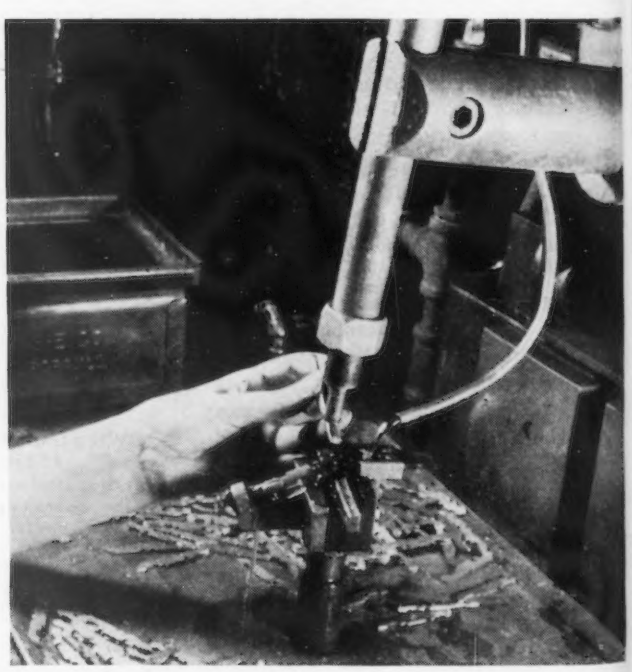


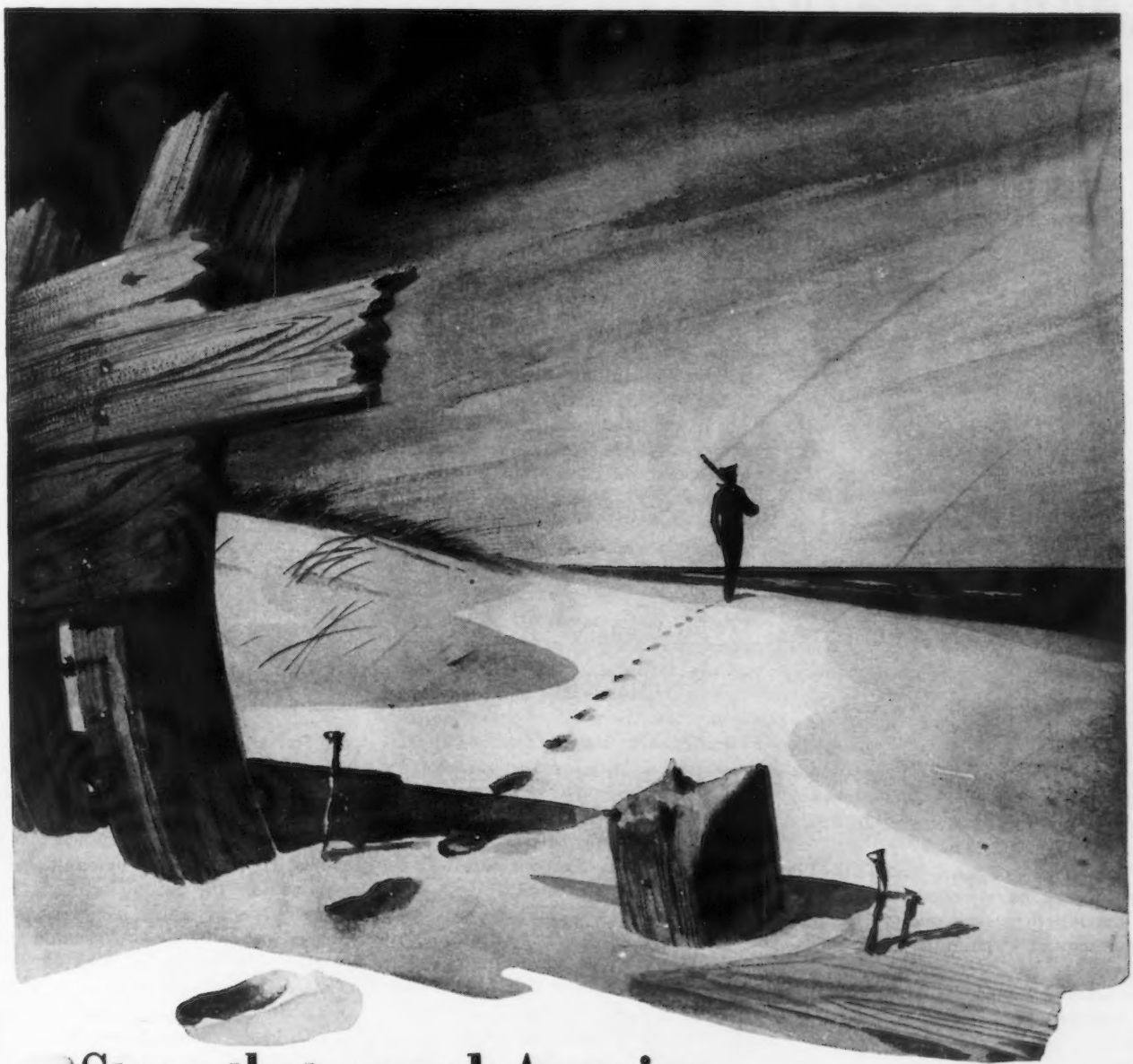
ABOVE

NEAT appearing, completed welds have exceptionally strong unions. Here a 1176-strand cable of 0.002-in. wires was welded to Riverside bronze and to bimetal in the center assembly, while a total of 3640 strands of 0.003-in. wire were welded to tinned copper lugs in the large assembly. The other pieces are welded to 2352 strands of 0.002-in. wire.

BELOW

RESISTANCE welding underwater speeds production and improves quality. The continuous stream of cooling water passing across the fixture does not interfere with placing of parts. The cupaloy tip in the upper (moving) holder as well as the stationary tip and fixture may be changed quickly for different types of assemblies.





Steps that guard America

He walks alone. His footsteps, plodding down some unnamed, silent beach, are a trail of protection between you and our Axis enemies.

Within the nation itself, there's a guardian's job we all can share. By caring for our tools and equipment, we make them last longer . . . and so save vital metals, and time, for greater war production. Storage batteries, for instance, last longer when you follow four simple rules of conservation. Obey them and you hit the Axis. Buy to Last and Save to Win!

Exide
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THE ELECTRIC STORAGE BATTERY CO., Philadelphia
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STEPS THAT GUARD BATTERIES!

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

Assembly Line . . . STANLEY H. BRAMS

• Finance companies move directly into manufacturing fields . . . Acquisitions infer permanent change of policy, leading to wider diversification.

DETROIT—A trend of broad significance in the nation's industrial picture, all but overlooked up to now, is the increasing tendency of automobile finance companies and other classifications of finance companies to get into the manufacturing business.

The largest finance companies in the country have moved actively into industrial operations, and give definite indication of expanding such efforts as quickly as circumstances permit. The smaller companies, too, are rapidly becoming interested in industrial activity.

The immediate objective is the utilization of the substantial funds which are held by finance companies and which presently are idle due to the sharp diminishment of retail time purchasing. At the same time, the wedding of capable administration in smaller industrial plants to the financial breadth of the finance companies is proving a happy one in numbers of instances.

The finance companies are not making management mistakes. They are confining purchases to companies whose operations, they feel, are capably administered. They are utilizing technically trained executives of their own organizations to keep an eye on the new properties, but not to take substantial part in operations. They may set policies, but they permit the plant managements to do the production job.

The Commercial Credit Co. purchased several manufacturing companies in varying lines of business during the last six months of 1942 and may have added more since. The reason for this program was frankly a desire to further diversify activities and utilize part of large available resources resulting from liquidation of instalment receivables.

ALTHOUGH the names and locations of the individual companies thus acquired have not been made public, indications are that close to a dozen separate firms were thus absorbed. One of them is a fairly active Detroit machine and precision parts manufacturer. In all, the investment of Commercial Credit in these plants was stated in the recent annual report at $8,762,746; book value was set at $9,323,192.

Directors and certain of the senior officers of Commercial Credit are keeping in very close touch with each of the manufacturing operations, although prime reliance has been placed upon the respective managements. Purchase of the various companies was made only where satisfactory arrangements could be set up to continue the existing managements almost without any disturbance. The only practical effect of Commercial Credit's entry in such concerns was the change of stock ownership.

Commercial Credit has the hope of operating each of the companies thus acquired after the war. However, the dominating feeling of the board of directors is that the prime objective of the company should be to keep itself out of the position of operating losing properties. The logic of thought on this score is that the various purchases made by Commercial Credit in recent months will not be continued if they prove unable to make money in peacetime—but at the same time they will be definitely continued if they achieve satisfactory post-war showings. Several of them, it might be said, are not "war babies" but have very good pre-war histories.

The chairman of Commercial Credit, A. E. Duncan, incidentally, is no stranger to the manufacturing field. For several years he has controlled two manufacturing plants which have undergone progressive development. The finance company itself has for a lengthy term owned control of Gleaner Harvester Corp., Independence, Mo.

THE Commercial Investment Trust Corp., largest of the independent financing companies, has diversified its activity by purchasing two concerns in the electrical field, the Holtzer-Cabot Electric Co., of Boston, Mass., and the Micro Switch Corp., Freeport, Ill. CIT owns all of the capital stock of these companies, both acquired in the latter half of 1942.

Purchase of these concerns was decided upon for two reasons—to employ some of the corporation's resources in the war effort and at the same time to diversify its activities. In this latter reason is seen the kernel of belief that the manufacturing ac-

ROMMEL ROUTERS: M-4 tanks and M-10 destroyers are being mass-produced side by side at a Ford Motor Co. plant. Tank destroyers fill the line on the left, while medium tanks come off the line at right.

IF THESE WORKERS "Fumble" YOUR MACHINES STAND IDLE

Prominent numbering of the receptacles for small taps and plug and ring gages makes for speedy handling, minimum delay at the tool crib window in this efficient crib arrangement. *Photo courtesy General Electric Co.*

These swinging racks give ready access to reamers, maximum protection to each tool. Quick identification even for inexperienced help is assured by prominent labels in front. *Photo courtesy General Electric Co.*

Installed for temporary storage of small items, these oblong cans have given very satisfactory service. Composition containers might well be substituted if metal ones are not available. *Photo courtesy Brewster Aeronautical Corp.*

EVERY needless minute your costly machines stand idle between jobs means less production for you — and a longer war for all of us.

The photographs here may show you the way to an important saving. For each shows an arrangement that gets tools on the job with no waste of those precious minutes.

No one of these arrangements may fit *your* shop . . . but that's not the point. They may suggest a method adaptable to your requirements.

In checking your tool storage methods, keep these three fundamentals in mind:

1. A place for every tool, with a record to show its disposition when it's out.
2. An easily read and systematic means of identification.
3. Ample protection for keen cutting edges.

There are few places in your plant where careful planning will pay you more than your tool crib.

GTD GREENFIELD

TAPS · · · DIES · · · GAGES · · · TWIST DRILLS · · · SCREW PLATES

ARMY E NAVY

GREENFIELD TAP AND DIE CORPORATION
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GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

Tool Conservation Begins in the Tool Crib

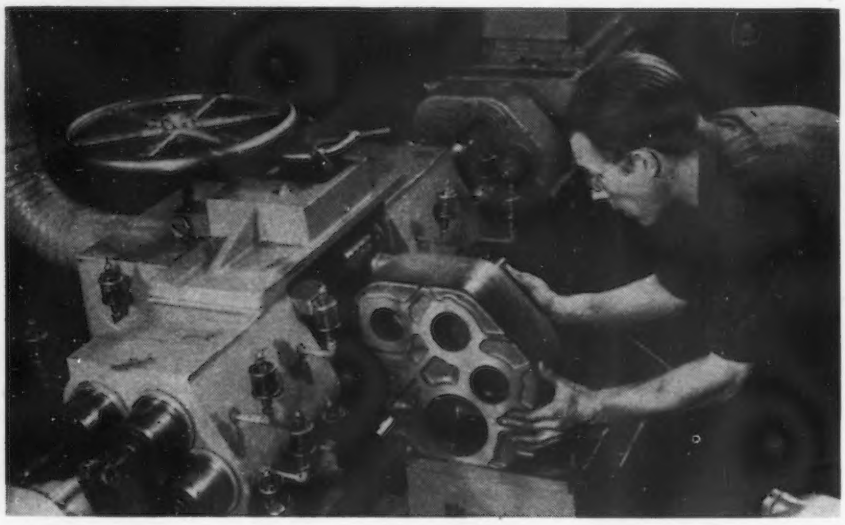
tivity will continue after the war period by CIT. It is known that the concern is investigating other opportunities which present themselves in manufacturing and other fields with a view to possible further employment of its available funds and enlargement of its activities.

Holtzer-Cabot produces motors and generators of fractional horsepower ratings, mostly of special design, utilized for recording instruments, business machines, ventilating and air condition systems and telephone central stations. The company's signal division manufactures signaling, paging and call systems, and fire alarm and watch protective systems for installation in public buildings and industrial plants.

Micro Switch Corp., organized in 1937, is a producer of precision snap action switches, mechanically or thermally activated.

Both these companies are heavily engaged in war work today and employ approximately 2000 persons. Facilities have been enlarged, and are being enlarged, in both companies.

MULTI-CONVERSION: Chevrolet has converted an idle horizontal drill into a special transfer case drilling machine by using two transfer cases for drill heads and connecting to shafts by means of eight passenger car universal joints. Transfer case output was increased almost 60 per cent in the Army truck parts manufacturing plant.



ASSOCIATES INVESTMENT CO. of South Bend, which has grown in the past few years to be one of the largest finance companies in the country, has purchased through its subsidiary, National Industries, Inc., two plants which are in large-scale production today on war contracts. The Durham Manufacturing Co. at Muncie, Ind., is manufacturing shells, fuses and other small ammunition parts on prime contracts. The Bass Foundry & Machine Co. at Fort Wayne is likewise making munitions as well as large castings.

Associates had been interested in Durham in the past through financing operations. In the light of need of considerable capital outlay to convert to war work facilities used to manufacture metal bridge sets, card tables and other household and outdoor furniture, the absorption was a fairly natural outgrowth, particularly because of Associates' desire to aid in the war effort and at the same time utilize part of its substantial capital.

The Bass Foundry Division was taken over at a sale in a United States court.

Having purchased going concerns, Associates was put to no great difficulty in obtaining the engineering and executive talent necessary to administer the operations. In addition, the parent company set up a board for National Industries, Inc., which comprised in part a number of prominent and capable executives. The board includes Albert S. Bonner, president of Clark Equipment Co., Buchanan, Mich.; Thomas W. Simmons, chairman of the Pacific Iron & Steel Works, Tacoma, Wash.; Bernard J. Voll, president, Sibley Machine & Foundry Corp., South Bend; and Thomas W. Wickenden, metallurgical engineer of the International Nickel Co.

Having invested approximately 10 per cent of its $25,000,000 capital and surplus in these two manufacturing operations, Associates Investment Co., for the time being, has achieved the active manufacturing goal it set out to obtain. More absorptions cannot be ruled out, yet none appears in early prospect.

The company expects to continue in the post-war manufacturing field, reconverting Durham back to its household furniture line and utilizing Bass Foundry as in the past, for job and special work as well as production runs as available.

Employment in these two manufacturing operations total today between 2,000 and 2,500 people. The development of these operations made possible the transfer of several executives and a considerable amount of clerical and office help from the South Bend offices, where the dearth of automobile financing in the past year has noticeably reduced the amount of work required—a condition, it might be remarked, which is common to all finance company offices.

THE General Finance Corp., large agency headquartered in Chicago, is aggressively interested in moving into industrial developments. So intent are the directors of this company on their aim that they plan to change the company name to General Industries Corp., or some such title indicative of the turn toward an industrial holding company structure. Owen L. Coon, chairman of the board, anticipates that the war's end will find General owning a group of businesses outright, a solid background for continuation of activities in the sales finance field.

The first two ventures into industry made by General Finance have been the purchase of all outstanding stock of Bi-Metallic Products Corp., Chicago, and about 97 per cent of the stock of Climax Engineering Co., Clinton, Iowa.

General's industrial operations are planned for the long term. There is no intention of purchasing plants which cannot be operated during the post-war period. As yet there is no indication that the company intends to integrate whatever holdings it picks up, or to concentrate them in any specific field; the determinant is whether operations can be acquired at prices which promises to make them worth-while investments. The broad attitude of this financing concern is well indicated by the fact that it has acquired recently all the common stock and a tenth of the preferred stock of the Civic Opera Bldg. in Chicago.

and Assures Proportionate INSPECTION USEFULNESS

The average wear-resistance of a Lincoln Park chrome plated gage is approximately five times that of a similar steel gage.

Today, thousands of worn gages and non-cutting precision tools are no longer discarded and replaced by new gages and tools in which critical metals are used, and for which many man and machine hours are required in manufacture. Instead they are salvaged by Lincoln Park processes in which they are carefully prepared for plating, are hard chrome plated, and then finished to specified tolerances. When completed, they are ready for a service life far exceeding their original period of service.

In addition, Lincoln Park chrome plated gages can be specified to much closer required limits than steel gages. Because allowances for wear can be reduced considerably, your production departments get the resulting benefits of greater manufacturing tolerances.

It's good business on your part . . . it's a definite contribution to the War Effort . . . to have Lincoln Park put new life and greater usefulness into all of your gages which can be salvaged by chrome-plating.

ARMY (E) NAVY

LINCOLN PARK TOOL and GAGE CO.

LINCOLN PARK, MICHIGAN

Washington . . .

L. W. MOFFETT

• Concentration of civilian industries offers solution to war manpower problem where voluntary methods have failed to divert a shortage . . . Nelson statement does not shut off all hope that concentration may be finally achieved.

WASHINGTON—Some reports that WPB is proceeding on a nationwide plan for concentration of industry may be "dead pigeons" as Chairman Donald M. Nelson called them last week, but Mr. Nelson did not shut off all hope that extensive concentration may be brought about.

The reports, Mr. Nelson said, apparently were based upon two confidential memoranda circulated to the WPB Committee on Concentration of Production, one dated Nov. 19, 1942, and the second Jan. 19. The list of industries carried in the stories was contained in the 1943 report to this committee, which went out of existence some three months ago, and does not in any sense constitute a list of industries for which WPB is now considering a concentration program, Mr. Nelson declared.

Mr. Nelson said that a new committee may be appointed to make a fresh start on concentration studies, to determine finally whether under present circumstances concentration is feasible or desirable and, if so, in what industries.

"If we appear to be making haste slowly in this important field," he said, "it is because we do not want to disrupt the pattern of American industry without gaining corresponding benefits. We must be sure that the savings derived are important enough to offset the damage to individuals and businesses. When we can see that balance achieved in a particular field, concentration will result."

MR. NELSON went further to say that WPB has made a continuous study of concentration since its inception in July, 1942. He said that the one inescapable conclusion from that study is that no formula or general plan for the concentration of a great number of industries is possible.

"The good faith of the reporter who wrote the story is not in question," continued Mr. Nelson, "but the information on which his article was based is not true. The industries listed in his story are those in which some study of concentration has been made. It is not a list for which concentration is particularly practical or desirable and it does not include many industries in which concentration probably would be helpful. It is merely a preliminary, incomplete study which was made last year and which is today a dead pigeon."

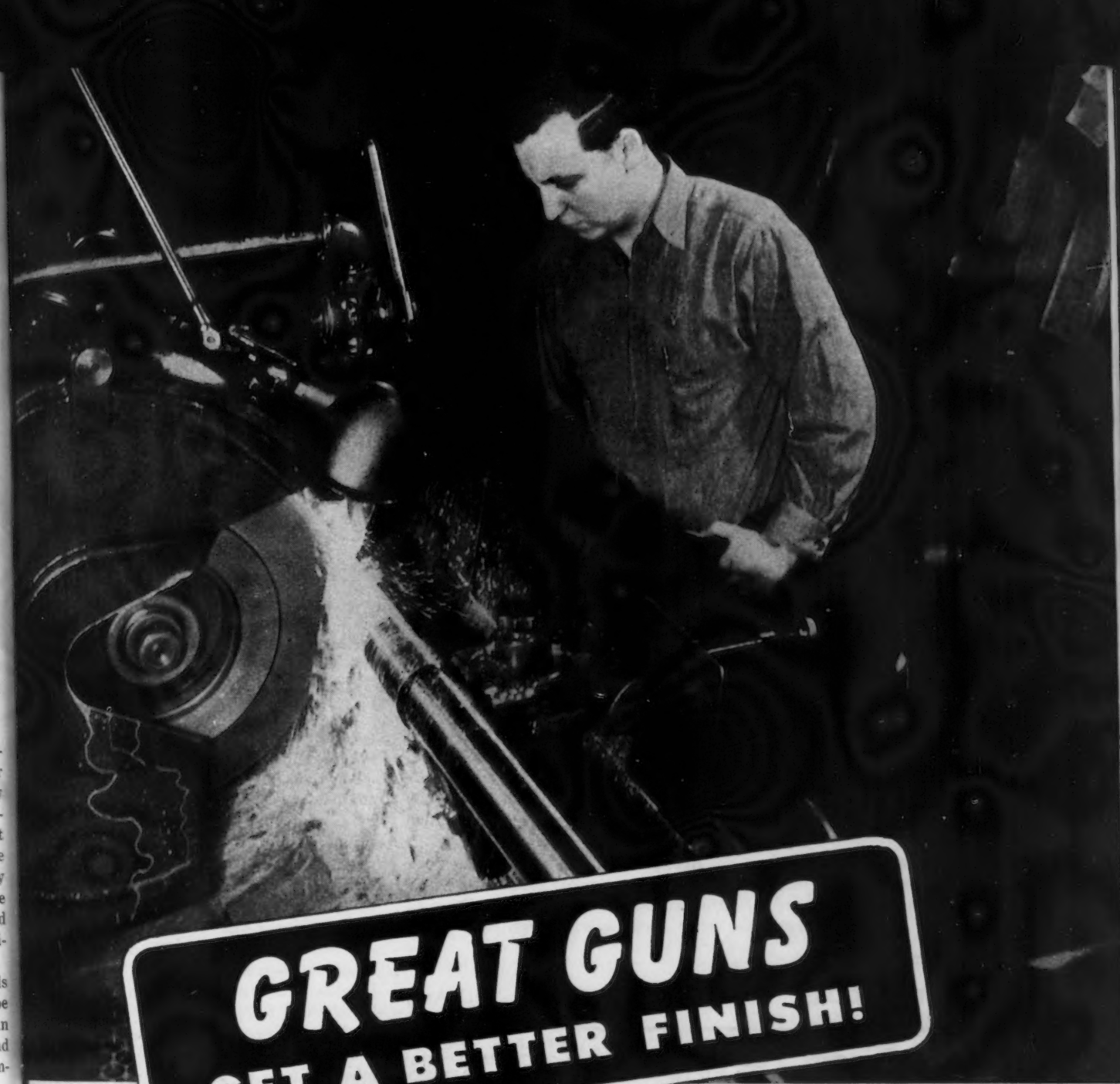
Mr. Nelson did not say what other "inescapable conclusions" had been reached about WPB's concentration program, what good could be accomplished by concentration. He might have shown more "good faith" himself if he had said that one of the reasons the story referred to was inapt is that WPB's concentration program is a dismal failure.

Of the hundreds of civilian industries subject to WPB rule, only five attempts have been made at concentration. These five industries are: Farm implements, bicycles, domestic ranges, typewriters and certain paper and pulp mills near Puget Sound. Only in the instances of bicycles and domestic ranges can it be said that the efforts were moderately successful. The farm implement program bogged down because WPB listened too much to political forces who said that the industry was far too complicated to yield to concentration. No real concentration was effected by the order on typewriters where all manufacture was ordered stopped except in one plant which only makes machines for government consumption. Only half of the 200,000 workers in these industries have been released for war work.

THE concentration of civilian industries offers an out to the war manpower problem, where "voluntary methods" have failed to avert a shortage. High WPB officials say that even inventive pay plans which are reported to be under consideration by management and labor groups in the war production centers do not afford the same manpower saving possibilities that concentration does.

Obviously, if the over-all demands of war are to be met there must be sharper curtailment of employment in civilian manufacturing, trades and services. The War Manpower Com-

G-E TURBINE: J. A. Krug, WPB vice-chairman and director of Office of War Utilities, and other WPB officials inspect the lower half of one of the turbines being built for four 30,000-kw. floating power plants at a General Electric Works. G. B. Warren, G-E design engineer, points out a construction detail to Mr. Krug, right, as the others look on.



GREAT GUNS GET A BETTER FINISH!

Photo by
of War Information

SUNOCO EMULSIFYING CUTTING OIL

improves finish . . . cuts cost . . . on grinding operation at gun plant

With so much depending on them, American guns have *to be good.* They are! On the far flung battle-fronts of the world, rifles and tommy guns, howitzers and 16 inchers produced in American factories are proving to be without equal.

One contributing factor in making possible the nth degree precision of these guns is Sunoco Emulsifying Cutting Oil. For example, one large plant was having trouble with the finish of its gun parts. At the suggestion of a Sun Oil Engineer—one of those well-known Doctors of Industry—a change was made in the coolant on the grinding operation. One part of Sunoco Emulsifying Cutting Oil was mixed with 45 parts of water and tried on one machine. Improvement in finish was so marked it could be seen with the naked eye. Immediately Sunoco was adopted for all machines using a soluble cutting oil . . . and besides getting better finish, the company saved nearly 50% in cutting oil cost!

That's typical of how Sun Oil Engineers and Sunoco Emulsifying Cutting Oil are helping the metal working industry in its tremendous war effort. Prove Sunoco's production-boosting merit in your own shop . . . under your own conditions. Write

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SUN PETROLEUM PRODUCTS

SUNOCO

HELPING INDUSTRY HELP AMERICA

mission "work or fight" order to married men with children who are employed in so called "non-essential industries is a step in this direction. Notwithstanding this fact the WMC method is hit-or-miss and does not assure that a minimum amount of essential civilian goods are going to be produced.

The military forces want 11,000,000 men by the end of this year and food production goals have been set fantastically high. Food Czar Chester Davis has said that he is going to recruit a "land" army of 3,500,000. More than this WMC says that 3,500,000 workers in addition must be transferred from non-war to war employment and that unemployment must be reduced to 500,000.

The munitions industries alone, including basic metal and chemical industries, utilities and transport, will be 800,000 workers short even if WMC's most optimistic estimates of the number of new entrants to the labor force, transfers within areas from trades and services, as well as from civilian manufacturing industries prove accurate.

A GREAT portion of this shortage could be made up, WPB officials say, through the concentration of about 10 major civilian industries. They are: Textiles, apparel, furniture, pulp and paper, tobacco, printing, leather, stone, clay and glass. These industries alone are said to employ more than 800,000 workers in critical labor areas.

Recommendations have already been made by responsible officials to WPB that strenuons efforts be employed to bring about a widespread and rapid concentration of civilian industries to ease manpower requirements. Considerations of financial discomfort to the business interests involved should be dropped and anxiety eased through compensation schemes for sharing profits. Other governmental financial assistance to civilian industries could be made available where necessary, it was pointed out.

WMC cannot successfully direct the transfer of labor from area to area because it does not have the necessary legislation. Persuasion and voluntary methods have proved ineffectual. Workers are reluctant to leave their jobs for fear of loss of seniority or decreases in pay. Campaigns to recruit labor from local service industries are disruptive to such communities where shortages may develop in industries of this type.

The transfer of workers from one area to another causes overcrowding with resultant housing and service facility shortages. It is estimated by one source that the transfer of 800,000 workers from an unemployment area to a labor shortage area would force the critical labor area to furnish accommodations for an additional 3,200,000 people.

International News Photo

TEST TARGET: Rear Adm. W. H. P. Blandy, chief of Naval Bureau of Ordnance, and Capt. David Hedrick examine piece of armor plate battered as newsmen toured the Dahlgren Naval Ordnance Proving Grounds in Virginia. The armor held.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

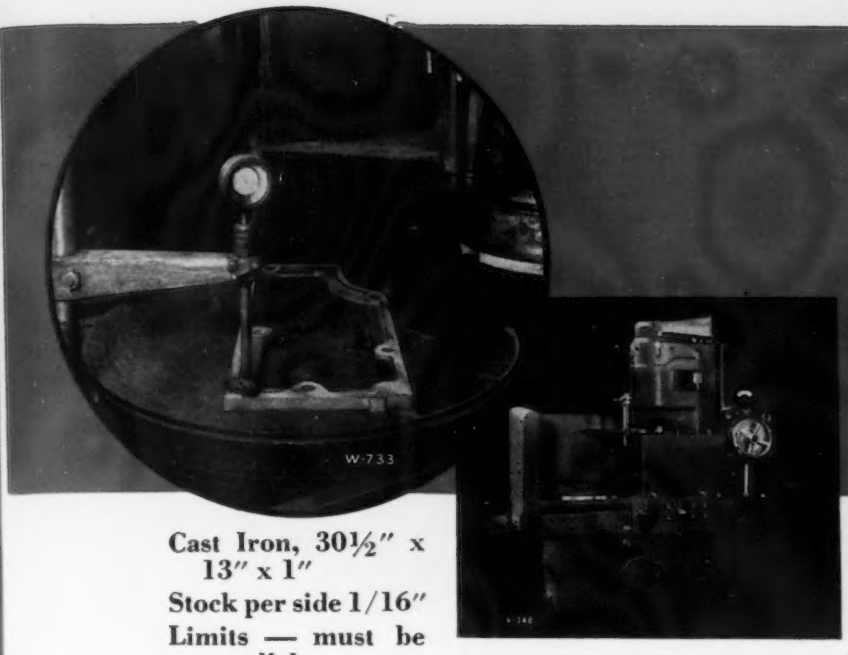
WE'LL SAY THIS IS MONTGOMERY AND OVER HERE IS ROMMEL-- NOW THIS GEAR IS OUR ARMY, THEN TH' BRITISH FIRST ARMY IS-- LET'S SEE--
THE OLD BLUE PRINTS COVER UP A LOT O' LOAFIN', DON'T THEY? THEY HAD A QUARTET HERE THAT USED TO PRACTICE WHILE HOLDIN' UP A BLUE PRINT IN FRONT O' THEM
JUST LIKE THE OLD GEOGRAPHY IN SCHOOL--I LEARNED EVERYTHING I DIDN'T NEED IN SCHOOL BEHIND A GEOGRAPHY, AN' EVERYTHING I DIDN'T NEED IN A SHOP BEHIND A BLUE PRINT!
J.R.WILLIAMS
THE BED SPREAD
4-23
COPR. 1943 BY NEA SERVICE, INC.

Notes of the Times: Best Chefs Are in War Plants

• • • Gourmets in the downtown district at Detroit are putting up with short-order cooks in many favorite spots these days, while some of the city's expert chefs are working at some of the big new war plants in the outlands.

"PUT IT ON THE BLANCHARD"

BLANCHARD



Cast Iron, 30½" x 13" x 1"
Stock per side 1/16"
Limits — must be parallel
Number of Sides 2
2 pieces (4 surfaces) per hr.

CHECK THESE ADVANTAGES OF BLANCHARD GRINDING

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Adaptability

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★ **Fine Finish**

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Close Limits

★ . . . . . *Especially valuable on jobs like the one illustrated.*

Here the easiest way is also the best. This is a difficult job to do any way but on a Blanchard. The piece is of thin section and apt to spring if it is locked in a fixture strongly enough to hold it. The piece is shimmed the first time and a clean-up cut is taken. It is then turned over and a light cut taken on the other side. This operation is repeated four or five times before it is finished.

The BLANCHARD MACHINE COMPANY

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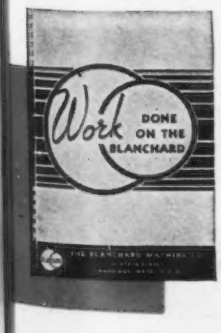
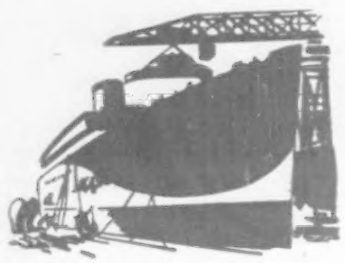


Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

WEST COAST . . . OSGOOD MURDOCK

• Aircraft parts makers hit by uncertainties . . . Big airframe companies form national group . . . Back-to-farm propaganda unsettles coast personnel.



LOS ANGELES—Contract renegotiation has caused a great deal of squirming and twitching among authors of annual reports for the industrial aristocracy of this region for some time, but now the shadow of doubt is beginning to descend over the hundreds of smaller manufacturers and parts suppliers who constitute the vertebrae of southern California's backbone, the aircraft industry.

After plying Col. A. J. Browning, director of purchases for the Army service forces, and Maj. E. A. Mattison with victuals, the Aircraft Parts Manufacturers Association, which represents the many smaller manufacturers of components and spares, set out to impress the renegotiators with the vicissitudes which its members have undergone. Analyzed, they are considerable; enough to cause gray hairs to management, but thoroughly characteristic of those undergone by small manufacturers everywhere under war conditions. As outlined by T. T. Arden, association president, the woes are principally these:

1. The parts manufacturers have not been characteristically favored with repeat orders in large volume. Extensive variety and constant change in parts made it impossible to establish volume production.

2. Shops operating with machine tools —some of the "backyard" shops have few, if any—have encountered labor pains. As elsewhere, the skilled labor pool has evaporated, mostly into supervisory positions in the larger plants. This leaves the smaller shops a program of labor training, starting from the burr bench and upgrading, in order to operate precision equipment which has drained the investment capital of small entrepreneurs.

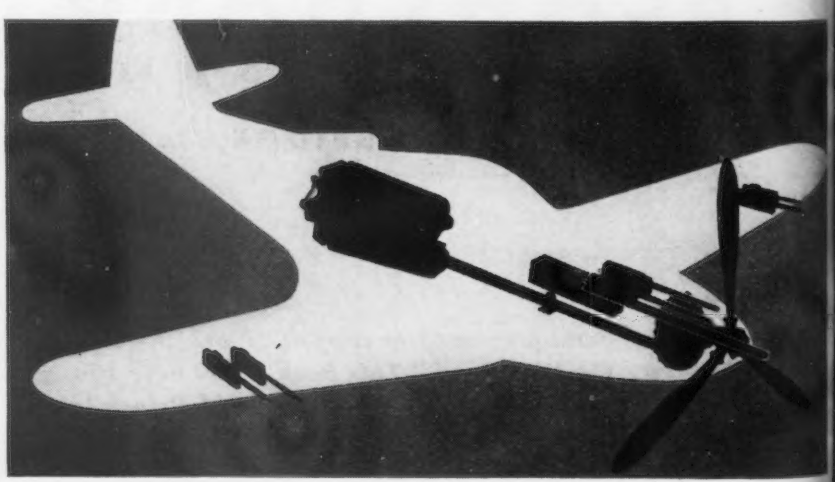
3. Some parts manufacturers have dealt almost exclusively in labor hours, the prime contractors having furnished the material. This has been a characteristic of sub-contracting by the airframe industry. In the sub-contractor's shops where material is furnished by the prime, the burden of spoilage has had to be borne by the sub-contractor.

4. Air Corps policy, to neglect engineering originality in favor of standardization, is unpopular with many of the suppliers of components. Many of these firms have grown to present size from humble beginnings as custom machine shops rather than on tailor made operations plotted for large scale, low margin production. Thus, the creative element among these shops, those who have engineered improvements on current designs of accessories, controls, and devices, feel distraught at being unable to put these refinements into production because of freezing of specifications. This question always brings plenty of debate.

5. Many shops, particularly those which have come into operation since 1939 when the real boom started here, still are amortizing heavy capital investment in machine tools, and feel that they should have special consideration on this account in any contract renegotiation. They point out that long established shops in other parts of the country have long since paid for their general purpose equipment. Another complaint comes from shops which have had to purchase second rate equipment, and now find themselves with large sums in sub-standard equipment which has yet to be amortized.

LONG discussed, but never ratified, nationwide organization of airframe manufacturers was finally accomplished last week with the christening of the new organization, the National Aircraft War Production Council, Inc., taking place in the Hollywood offices of the West Coast airframe group. Possibly skepticism as to what could be accomplished by a national organization, reluctance of established concerns to open themselves to pirating by Johnny-come-latelies in airframe manufacture, and the ghost of the old aeronautical Chamber of Commerce all combined to delay unification of the first-born West Coast Aircraft War Production Council and its prototype in the East. Miraculously successful handling of the touchy West Coast wage stabilization problem by concerted action, growth of such common industrial problems as contract renegotiation, and the standardization of models being constructed by widely separated and corporately unrelated plants at last has provided sufficient glue of mutual understanding to hold a national group together. Members from the West Coast are Boeing, Consolidated Vultee, Douglas, Lockheed-Vega, North American, Northrop, and Ryan. When this Western group originally was formed, it comprised eight southern California companies, but the accession to membership of Boeing, and the successive mergers of Lockheed with Vega, and Consolidated with Vultee have given the group a different face. Eastern members of the national group are Aviation Corp., Bell, Brewster, Curtiss-Wright, Eastern Aircraft Division of General Motors, Fairchild, Martin and Republic. The Council claims to represent 90 per cent of the nation's war plane assembly and a high percentage of engine and propeller production. Absenteeism from the list compares unfavorably with that common among employees and may be due to certain New England aloof-

AERO-POISON: Airacobras flown by U. S. Army and Soviet fighter pilots, have a firepower of four .30 cal. guns in the wings, two .50 cal. guns in the nose and extending through the hollow propeller hub, a .37 mm. cannon.



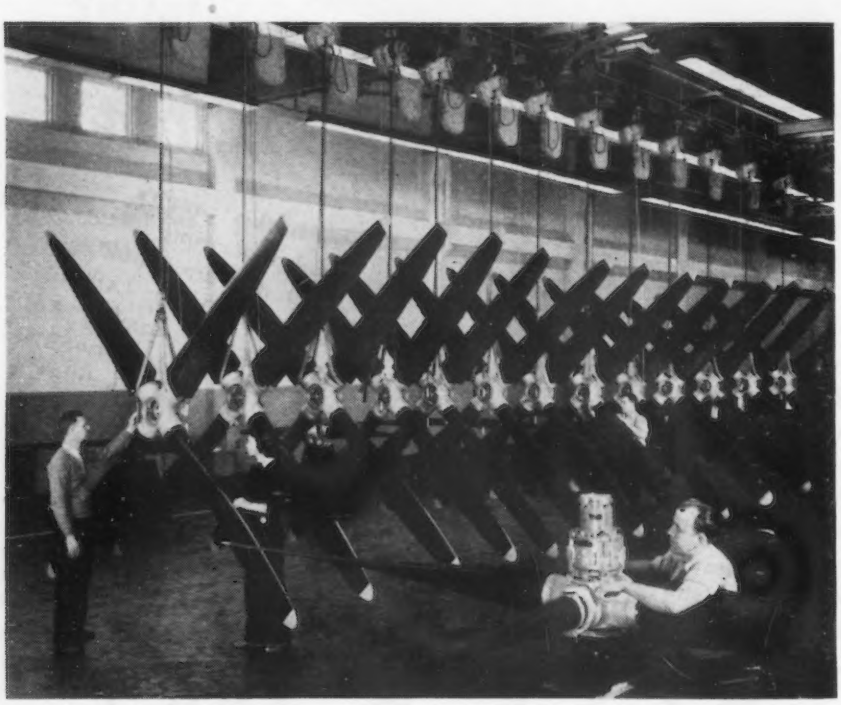
R SHORT OR LONG RUNS
Boring, Turning, Facing, Grooving, Chamfering
• • • with Precision!
Tomorrow, just as today, the watchword of industry in this country will be "Production." With the lid lifted high on accumulated peace time needs, the advantage will then definitely be with those who today are installing equipment for war production with thought for the future. The Ex-Cell-O Precision Boring Machine—for boring, turning, facing, grooving, chamfering to "tenth" accuracy—is the preferred type and make of equipment among many manufacturers producing parts for war purposes in large quantities today; its extreme flexibility in application makes it an equally sound investment for the inevitable tomorrow, in shops either small or large.
EX-CELL-O CORPORATION • DETROIT
EX-CELL-O MACHINES
Precision AND TOOLS
XLO
CELL-O means PRECISION
EX-CELL-O
R HIGH PRODUCTION

ness and Midwestern sectionalism, indicating that there are yet disbelivers in the value of industrial organization.

With the exception of interchange of material, which has been a practical part of the local Council's work, the stated functions of the national group are merely a broadening of the local practice: Coordination of interchange of information and facilities to avoid duplication and delay—a service that will also be extended to nonmembers; service on research and information on war production in cooperation with Federal agencies and military forces; efficiency data pooling. Added to these is the program to organize combat area maintenance stations so that one company's crews can service planes of another manufacturer which are operating in the area.

Liaison officer for the group will be Frank F. Russell, president of National Aviation Corp. and director of both Lockheed and Bell, who will maintain an organizational fountain head in Washington to plead the case of the industry.

WARPLANE PROPS: In the newly completed warplane propeller plant of Curtiss-Wright Corp., "somewhere in Indiana," completed Curtiss electric propellers of the four-bladed type are being carried along a conveyor to the final balance room.



MARITIME Commission reports of higher labor turnover in Pacific Coast yards than on the Gulf or Atlantic Seaboard together with data indicating that Pacific yards were understaffed by 60,000 men at the end of the first quarter have been greeted with skepticism in some informed labor supply quarters which accuse the commission of attempting to polish apples with Selective Service.

This theory fits in with a noticeable exodus, confirmed by the yards, of farm workers who have suddenly felt the call of the soil both in California and in the Midwestern states from which so many of them came originally. Recent concerted propaganda by Selective Service, touting deferments for farm workers, has been the first and only effective neutralizer of the magnetic pull of shipyard employment since the yards first began their recruiting program. The gradual fraying of former blanket deferment for shipyard workers has suddenly made the farm look attractive again. Moreover, the Western non-ferrous metal mining industry, already bruised and bleeding from completely impractical War Manpower Commission "freezing" directives, has taken another sock on the chin from the "back to the farm" selective service propaganda to such an extent that the mine manpower scarcity this summer may well outstrip last summer's famine.

Generalizations concerning hig labor turnover in the shipyards ar more than borne out in the newe yards, however, where a 20 per cen monthly replacement figure is not ou of line. Necessity of the newer yard to hire the culls and rejects of th established shipbuilders has resulte in drawing heavily upon migrant and floating population to a greate extent here than on the Atlanti Coast where the yards were locate near centers of population and ship building was better integrated wit the normal industrial structure. Res lessness is greatest among the olde age group, among the newest emplo ees, among women and in the lowe pay bracket. About seven per cent o total turnover is in leadermen, fore men and quartermen, the supervisor staff.

Employment of women has zoome having hit 17 per cent at Kaiser Richmond yards, and is still climbin helping the general labor shorta somewhat, but weighting turnove figures.

THE story is rife, and possibl with some truth, that Californi is making the greatest war produ tion per capita of any state, and a the same time the highest percenta of the population is subject to sele tive service. At any rate, the sta now holds contracts for major w supplies and construction projects i the amount of $10,865,086,000, more than ten per cent of the nation total, retaining its rank as first sta in the nation in volume of war co tracts. The story runs that the hig est proportionate selective servi registration is in California and th there are also a number of addition young men working in California ai craft and shipbuilding plants who a registered in other states, but w will be withdrawn from California i dustry for induction. During th coming year, 700,000 men or six a one-quarter per cent of the U. total, will be inducted from Calif nia. Military installations will r quire the services of 300,000 m civilians. It has been publicly es mated that the state now is sh 300,000 workers, but the above mi tary requirements will mean that t shortage will be increased by o million by 1944. This year the W Coast with a 10,000,000 populat will be expected to build 35 per c of U. S. shipping and 40 per cent the country's aircraft. The only a swer is in more efficient labor ut zation, and to many that is anot may of spelling National Service A

MATCHING AN ACK-ACK FOR WIDE-RANGE ACTION

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The sky-wide sweep of a modern ack-ack gun has nothing on this HydrOILic Press when it comes to wide-range operation. This streamlined open-side unit is ready with up to 100 tons of smooth-flowing oil-hydraulic power for quick, accurate action on straightening, bending, assembling and broaching jobs.

A simple adjustment sets the stroke at any length up to 18", and pressure can be pre-set at any point from 10 to 100 tons. Or, the operator can regulate the power and stroke "as he goes" with the pressure gage at his right showing tonnage changes pound-by-pound. Speed of operation can be varied as desired. Fixtures and tools can be changed readily. It's a fully enclosed press—high in safety factors.

The DLOS2-100 is available with either manual or electric controls, or both. Where complete safety is imperative, "two-hand" control can be provided. Maximum daylight opening is 36 inches. A similar model of 50-ton capacity is also available. For full information on this and other Denison HydrOILic Presses call your Denison representative, or write us today.

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DENISON
EQUIPMENT *in* APPLIED
Hydr OIL ics

Fatigue Cracks

BY A. H. DIX

No Sign Language User He

• • • Deafmutes, we mentioned last week, make excellent instructors in operations that are chiefly manual. This is easily understandable, for never having leaned heavily on the crutch of words, the deafmute has learned to talk with his whole body.

But the idea can be overdone, and we feel that it was unnecessary for your favorite family journal to emphasize, as it did last week, that the head of a certain well-known company, in addressing an important group on a rather involved subject, delivered a *verbal* report. Pantomime has definite limitations.

"I Came Here to Speak for Miles"

• • • Headline writing is an art—an art whose finest products are, in our fond eyes, exhibited to you weekly in this journal. A good headline, of course, is one you are not conscious of. Its job is to steer you into the text, and if in so doing it calls attention to itself, it failed as John Alden failed.

Take, for example, last week's item about alleged tinplate maximum price violations. Our headline, *"OPA Indicts Tinplate Black Market Operations,"* is perfect—brief, dramatic, interest-compelling, and at the same time leads you firmly into the text. Contrast it with the New York *World-Telegram's "Puts Dent in Tin Ceiling."* Here you have a deliberate sacrifice of clarity for humor. Then there is the headline that, because of careless word selection, achieves neither clarity nor humor. A good example is this front-page screamer in a recent issue of the New York *Sun*:

BRITISH FORCE FLEEING FOE INTO EXPOSED PLAIN OF GABES

The first line has two opposed meanings, a fault that is particularly unfortunate in these days when something is happening hourly, and when those of us who buy only two newspapers a day try to piece out the in-between news by reading around the iron weights the news dealers place on the noon editions.

And, Lo!

• • • We don't like bragging in the first person, not because of any over-dose of modesty, but because bouquets tossed by a third person have a more powerful fragrance. We are in favor of a system used by certain African tribes. A member of the chief's retinue is a tough-lunged press agent whose job it is to boast of his boss' prowess in battle and elsewhere, while the boss stands by modestly with downcast eyes, as if saying, "How he goes on," and thereby acquires a reputation for humility, without running the risk of having any of his virtues overlooked.

We wish, for instance, that someone had taken the trouble to count up the mentions in a booklet issued by the Automotive Council for War Production, Detroit, listing 361 important production articles in the current technical press. As no one else did, we did so ourselves and find that your favorite family journal, like Abou ben Adhem, led all the rest.

Of course, we expected to, but like the old maid in the story, we just like to talk about it.

Aptronym

Ever hear of C. C. Washer, expert technician (and other things), of the Philadelphia Steel & Wire Corp., maker of split lock washers?

H. A. Marchant, Chrysler Corp.

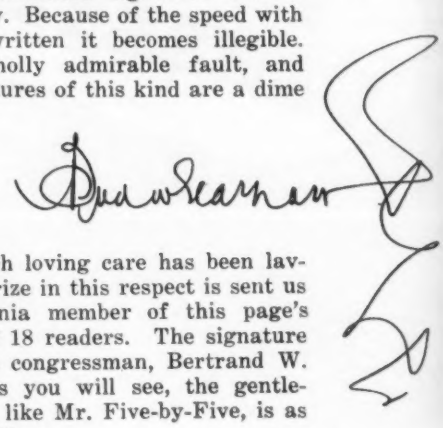
Humor Unbridled

• • • Keith Misegades of Arlington, Va., sends us a newspaper clipping announcing that the Anacostia Church of Christ, of Baldwyn, Miss., has a new minister whose name is Bonds Stocks. Mr. Stocks was formerly secretary to Congressman John Rankin.

This is one of the most unusual names we have ever heard of, and we can account for it only on the grounds that the dominant of Mr. Stocks' parents had a headstrong sense of humor. The classic instance of this is the case of Jim Hogg, a former governor of Texas, after whom Hogg County, Tex., is named and who named his three daughters Ima, Yura, and Sheza.

Signature with Bustle

• • • Men who have to write their names many times during the day gradually evolve a stream-lined signature out of sheer necessity. Because of the speed with which it is written it becomes illegible. This is a wholly admirable fault, and frankly signatures of this kind are a dime a dozen.



Our concern is with the fancy, time-wasting creations, on which loving care has been lavished. The prize in this respect is sent us by a California member of this page's loyal army of 18 readers. The signature is that of his congressman, Bertrand W. Gearhart. As you will see, the gentleman's scrawl, like Mr. Five-by-Five, is as broad as it is long.

Poets' Corner

The following is an original effort by Dick Nation, one of the boys here. It seemed to please both shifts, which is certainly something, if not history-making.

—*W. A. Groat, Jr., Indiana Gear Works, Indianapolis*

Ode to Mayhem

Man has known from the very beginning
That the forces of Good work by day,
While at night the dark spirits of Evil have power:
And robbers and murderers prey.

And here in the shop where we labor
The old superstition holds true,
For we on the day-shift are perfect, you know:
It's at night that the errors come through.

When the tickets we wrote them have vanished
And all of the gears "run away"
You can bet that the night-shift has caused all the grief;
It couldn't have happened by day.

They mix up the jobs and the blueprints,
Confirming the worst of our fears;
They drill the holes wrong and then blame it on us:
They polish the teeth off the gears.

But if something goes wrong on the day-shift
It's only a matter of luck
For we on the day-shift are perfect, you know
(Well, perfect at passing the buck.)

So I'm going to stay here some evening
(When I think I can master my fright)
To take a good look at those desperate men
Who ruin our work in the night.

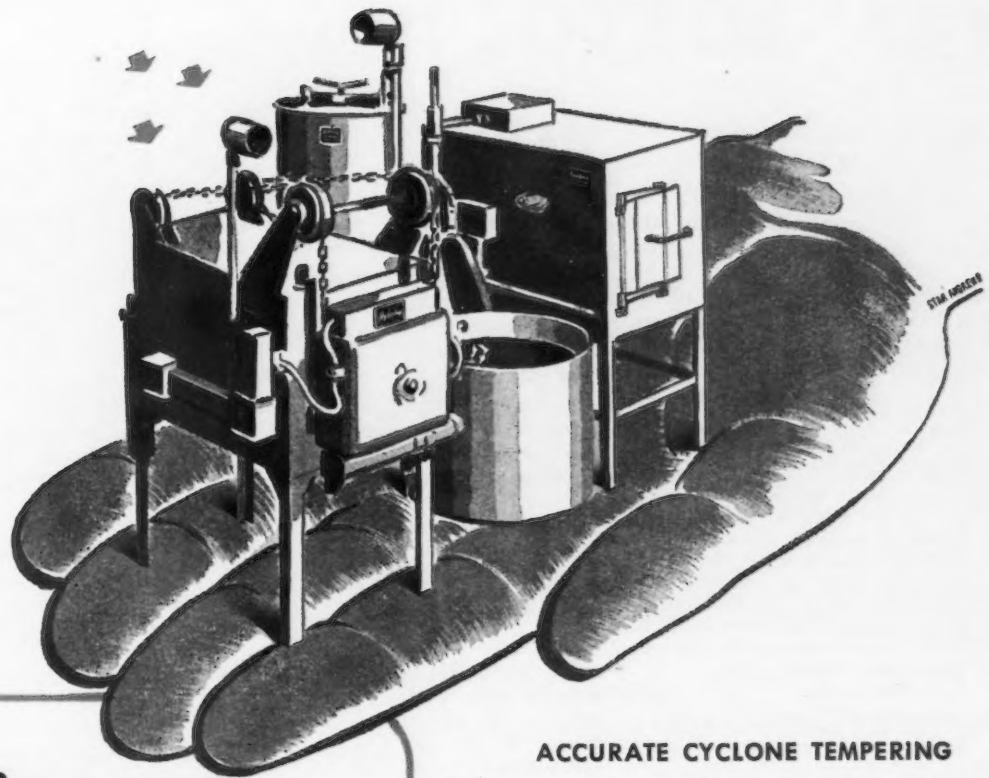
Up to now the unchallenged poet laureate of this page has been Doug (Lindberg Engineering) Rader, who swings a wicked meter and who has more changes of pace than Cab Calloway. He still has the job, but we see no harm in mentioning that Dick Nation's smooth, waltztime, Wayne Kingly rhythm lulls us pleasantly, and if Lindberg weren't an advertiser . . .

Puzzles

One of last week's tramps got 10c. and the other 70c.

Par for this is five minutes:

A boy slipped in and stole some apples from an orchard guarded by three watchmen. On his way out he met the three watchmen one after another, and to each in turn he gave a half of the apples he then had, and two besides. When he left he had one apple. How many had he originally?



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Give a plus value to each of your tools and dies. Value in longer life. Value in time and money saved. Give your toolroom a boost with hardening and tempering furnaces that will heat treat each tool and die with the same precision that went into their making.

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Tools and dies of even the "touchiest" tool steels, including highspeed, can be finished to size before heat treating when hardened in a Lindberg Hydryzing Furnace, because Hydryzing controlled atmosphere eliminates scale, decarb and carburization. This means that the parts have full, uniform hardness "as quenched" and the clean, hard surface saves the expense of costly grinding or polishing after heat treating.

ACCURATE CYCLONE TEMPERING

Hardening is but half the job. The hardened part should be tempered with equal accuracy to obtain its specified hardness. Key men in practically every toolroom in the country recognize the Cyclone Tempering Furnace for its rapid uniform heating. In fact, its heating and control accuracy is such that temper can be controlled to ± 1 Rockwell "C." And, too, you'll be amazed at its economy and efficiency of operation.

COMPLETE TOOLROOM SETUP

Lindberg can supply the finest available toolroom setup to meet any heat treating requirement, complete with quenching system. Write for Bulletin 94. It tells all the advantages of hardening with Hydryzing. And also ask for Bulletin 13. It shows why the Cyclone is the ideal tempering furnace for tools and dies.

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ARMY E NAVY

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

Dear Editor:

WEIBEL WELDING PROCESS

Sir:

In your April 1 issue, page 59, you have an interesting article on the Weibel welding process for flange welding of light metal sheets.

Could you tell us how we can secure a complete description of the process, which might be helpful to us in the production of war materials?

W. L. BRYDE
Packless Metal Products Corp.,
31 Winthrop Ave.,
New Rochelle, N. Y.

• As stated in the article, a more complete description is given in the German publication, VDI, 1938, No. 49. This publication is on file in the Engineering Society library, 29 West 39th St., New York. A photostatic copy may be obtained at small cost, and a translation of the text will be furnished at the rate of $10 per 1000 words, or $7.50 per 1000 words to members of the five supporting engineering societies.—Ed.

CUTTING SPEED CALCULATION

Sir:

I am interested in obtaining any available information or references you may have in regard to calculating and determining surface feet, machinability and feeds for drilling, boring and turning operations on drill presses and lathes.

L. B. ROSENZWEIG
Hughes Tool Co.,
Aircraft Strut Division,
Box 9188, Central Park Sta.,
Houston, Texas

• We recommend "Metal Processing," by O. W. Boston, published by John Wiley & Sons, New York, price $5; "Turning and Boring Practice," and "Drilling and Surfacing Practice," both written by Fred H. Colvin, published by McGraw-Hill Book Co., New York, price $4 each; and "Manual on Cutting of Metals," published by American Society of Mechanical Engineers, 29 W. 39th St., New York. We also recommend that you communicate with Frank Martindell, engineer, Western Electric Co., Hawthorne Works, Chicago, Ill., chairman of a committee on tool engineering literature of the American Society of Tool Engineers.—Ed.

FORD, NOT WILLYS, BUILT IT

Sir:

May I call your attention to an error on page 104 of the March 25 issue of THE IRON AGE.

There is a photo of Ford-built amphibian cars coming out of the slip at the River Rouge plant of the Ford Motor Co. The cutlines credit the amphibian to the Willys Motor Co.

This amphibian car is made only by the Ford Co. Other types, including amphibian tanks, are manufactured by other companies, and Ford and Willys both are building land jeeps.

CHARLES E. CARLL
Ford Motor Co.,
Dearborn, Mich.

• Apologies to Ford and a rebuke to a careless caption writer.—Ed.

VIVA, MOFF

Sir:

Courage is a virtue admired by all men, whether it be in the front line trenches or in Washington, D. C.

I am writing to express my delight and appreciation of L. W. Moffett's Washington article on page 72 of the April 1 issue, and in spite of the date line, Mr. Moffett was not "fooling."

If we had more Moffetts and fewer bureaucrats, our Government would not have to spend millions of dollars boosting our "morale."

G. J. HAWKEY
Cleveland Duplex Machinery Co.,
Cleveland, Ohio

CMP POSTERS

Sir:

On pages 94 and 95 of your April 8 issue, you show a series of posters relating to the Controlled Materials Plan. Where can I secure copies of the posters?

THOMAS H. COX
Bellanca Aircraft Corp.,
New Castle, Del.

• The posters were prepared by the CMP Division of the WPB, Washington, for use by specialists giving talks on CMP. We do not know whether copies are available for general distribution, but you might write to Harold Boeschenstein, Director of the CMP Division, Railroad Retirement Bldg., Washington.—Ed.

POVERTY NOT ALWAYS A SPUR

Sir:

Your ordinarily excellent editorials suffered an aberration in "Freedom from Want" (THE IRON AGE, March 11), which seems to me to be replete with inconsistencies.

Freedom of speech and freedom of religion were not originated in the Bill of Rights any more than in the Atlantic Charter. These freedoms are as old as Pithecanthropus but their availability was to be extended by each of these historic documents. The Bill of Rights guaranteed them to every citizen of this country, and the Atlantic Charter expressed the determination of two great democracies to spread beyond man-made boundaries these principles that belong to all humanity. This is our duty, our privilege, our heritage. Surely you do not believe that peoples living in small countries are any less entitled to these two freedoms simply because they lack the military power to make them secure from foreign conquerors.

To castigate freedom from want because it is harder to achieve is a barren reason, particularly to Americans. To complain that the Atlantic Charter was not specific on this point is obviously insincere. You would be among the first to criticize Mr. Roosevelt and Mr. Churchill for having the presumption and for taking the time from war work to present a finished postwar plan. In your eyes, if the chief executive is specific, he is dictatorial; if general, he is demagogic.

By its nature freedom from want is more complex and less specific than freedom of speech. This will make it more difficult to work out but it is no less essential to welfare and progress. One has waited longer than the other for attention, but it is natural evolution for democracy-loving peoples to establish first political freedom and then economic freedom. The former is a prerequisite of the latter, but—and this is the important point—the former does not automatically assure the latter.

To pretend that the term freedom from want lacks clarity is mere quibbling. To label it a platitude is reminiscent of "Let them eat cake." For a well-cushioned executive to laud poverty as mankind's "greatest spur to achievement" smacks of Satan himself. Surely, even in our own prosperous land, you have seen ragged, unhealthy, hungry people by the thousands living in tenement squalor. You have heard doctors say that the IQ of low-income Southerners can be raised appreciably by proper diet. You have read of recurrent famine in China and Russia. It cannot be these things you laud. Think of the leaders who never matured, the individual personalities that could never develop. Desire for success and even adversity are incentives to progress, but any psychologist or doctor will assure you that starvation (even just dietary deficiencies), disease, and poverty invariably have an opposite depressing effect.

Freedom from want does not imply yachts, of course. It does mean adequate food, clothing, shelter, and medication to keep every individual healthy in body and mind. This cannot be achieved by any type of dole system, but I think we're intelligent enough to accomplish it gradually by widening the economic opportunities of low-income groups and of minority populations. We'll do it at home and help do it abroad. Many so-called spokesmen for the American people underestimate our interest in people of other lands. The cooperation we give them may not seem to some people to be on the correct side of the balance sheet but it will prove to be our lasting benefit.

Your closing remark about the South Sea islanders is most illogical. You state they are free from want and it has done them little good, is probably would be of little benefit to us. One might as well say they have freedom of speech and have prospered little because of it, so why do Americans give up such a useless principle!

ALLAN F. MATTHEWS
4222 Second Road N.,
Arlington, Va.

ARMY E NAVY

To AMERICAN FOUNDRY EQUIPMENT CO.

"FOR GREAT ACCOMPLISHMENT IN THE PRODUCTION OF WAR EQUIPMENT"

WE PAY sincere tribute to the zeal and patriotism of our employees, and to the cooperation of our customers, business associates and suppliers for having been presented the Army-Navy "E" Production Award on April 16.

This distinguished honor makes us aware, even more than ever, of the responsibilities with which we have been entrusted.

We shall fly the "E" flag proudly as an emblem of work well done—and as a reminder and challenge to still greater achievements until final and complete Victory is won.

WAR DEPARTMENT
OFFICE OF THE UNDER SECRETARY
WASHINGTON, D. C.

March 20, 1943

To the Men and Women
of the American Foundry Equipment Company
500 South Byrkit Street
Mishawaka, Indiana

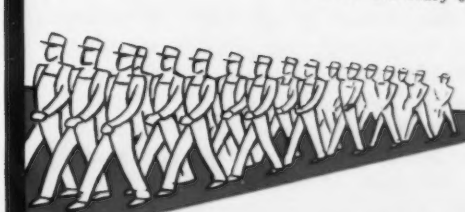
This is to inform you that the Army and Navy, on the recommendation of the War Production Board, are conferring upon you the Army-Navy Production Award for great accomplishment in the production of war equipment.

This award symbolizes your country's appreciation of the achievement of every man and woman in the American Foundry Equipment Company. It consists of a flag to be flown above your plant and a lapel pin which each of you may wear as a sign of distinguished service to your country.

I am confident that your outstanding record will bring victory nearer by inspiring others to similar high achievement.

Sincerely yours,

Robert P. Patterson,
Under Secretary of War



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WHEELABRATOR

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We Are Proud and Grateful for This High Honor . . . and Accept the Challenge to Even Greater Achievement

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THE AMERICAN WHEELABRATOR

AMERICAN FOUNDRY EQUIPMENT CO.
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This Industrial Week . . .

- **Plate Controversy Nearing Conclusion**
- **Cut in Specification May Be Helpful**
- **Other Problems Include Ore and Coke**
- **Users of Steel in Difficulties Also**
- **Ingot Production Continues Reduced**

THE controversy over the inspection of steel plates, which has grown into one of the most regrettable incidents on the home front in this war, appeared proceeding toward a conclusion this week. But in the meantime, the pileup of produced but uninspected material was threatening to slow down the chain of operations in some producing areas.

Lack of finishing space and storage space brought some plate producers face to face with the problem of what to do with slabs or ingots temporarily. Steel companies are not allowed to divert much raw steel to products other than those specified by the government.

While inspectors are double checking all their own actions, hopes of obtaining additional plate from mills which are under construction have suffered a blow. Two units supposed to be in operation this Spring have been delayed unavoidably by reason of the aluminum expansion program and a slab mill at another plant will require repairs because of overloading. Continuous strip mills which are struggling under an unprecedentedly heavy load will have to assume greater burdens, if possible.

Reduction of the Navy's tensile strength specification is expected by some authorities, and if the action is taken it may prove a helpful step toward relieving the present situation on steel plates. The importance of plate mills, which account for a large share of present day steel, is emphasized by the fact that third-quarter requests for steel total over 20,000,000 tons, against probable total production of 14,500,000 tons.

THERE are numerous other problems in the steel industry at the present time. With an all-time high total of 95,000,000 tons of iron ore to be moved this season down the Great Lakes, carriers still are unable to break through the thick ice and it may be May 1 before full-scale operations are under way. At Washington, recommendations are being pushed for alleviating a prospective shortage of coke for blast furnaces. If ovens are to be completed on the scale deemed necessary by steel experts, construction will have to be spurred. Temporarily, at least, a number of blast furnaces are down for long-needed repairs but when the rehabilitation is completed more coke than ever will be needed.

Users of steel have been going through difficulties too. The government's efforts to improve the scheduling of component parts have created problems. Many makers of machine tools, accessories, cranes, foundry equipment and heat treating equipment find it impossible to obtain on time the anti-friction bearings electrical equipment, pumps, clutches and gears which they need. Special priority assistance is likely to be offered on the basis of individual needs.

The Controlled Materials Plan with its numerous problems is still being changed in certain aspects, adding to the confusion of industrialists, who in some cases are encountering more and more paper work. The WPB has promised that there will be no revision for third quarter of the Class B products under the CMP, but it is said the list eventually will be overhauled.

INAUGURATION of the CMP has changed the whole significance of the number and tonnage of orders entered on mill books. The order flow is governed by the release of allotments out of Washington which means that peaks and valleys in new business

Alloys Recovered from Sludge

New York

• • • Success in the reclaiming of high speed steel grinding sludge is understood to have been achieved recently. One of the tool steel producers is being furnished concentrated metallic powders by an eastern company which has been experimenting with reclaiming.

The practicality of using the reclaimed powders in the melting of high speed steel has been determined. The work will be spread to other tool steel producers as rapidly as possible.

News Highlights in This Issue

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will be the rule in the steel industry. The trend will be even more pronounced when WPB tightens its restrictions to avert the failure of prime contractors to pass on orders and allotments to their sub-contractors.

Other events of interest in the past week include charges by labor leaders that improvident planning by the Army has caused surplus munitions production which ultimately will be reflected in isolated unemployment in certain areas. According to one authority, munitions output should be geared more closely to ship construction and ship sinkings.

WPB is still struggling with the steel supply problem of the oil industry and at the last meeting held about a week ago plans were submitted to help the little producers who are in need of steel but nothing definite was done. It has been suggested that seven to ten depots be established where stocks would be held.

IT is said that the steel allotments for the oil industry for the second quarter are 165,000 tons and for the third quarter 260,000 tons. According to steel and oil men though there is no definite assurance that this amount will be delivered to the oil industry.

There has been some talk in trade circles that customers are being forced to pay higher prices on NE steels than they would pay if they were able to get the standard grades. An analysis by THE IRON AGE shows this is too general a statement. In checking the first choice of NE steels which have been set up for the various standard grades, it has been found that 47 out of 60 of these first choice NE steels have an extra charge of less than the standard, nine are the same and four are slightly higher. Of the first choice NE steels which are lower, the reductions from the standard grade extras are considerable in some cases.

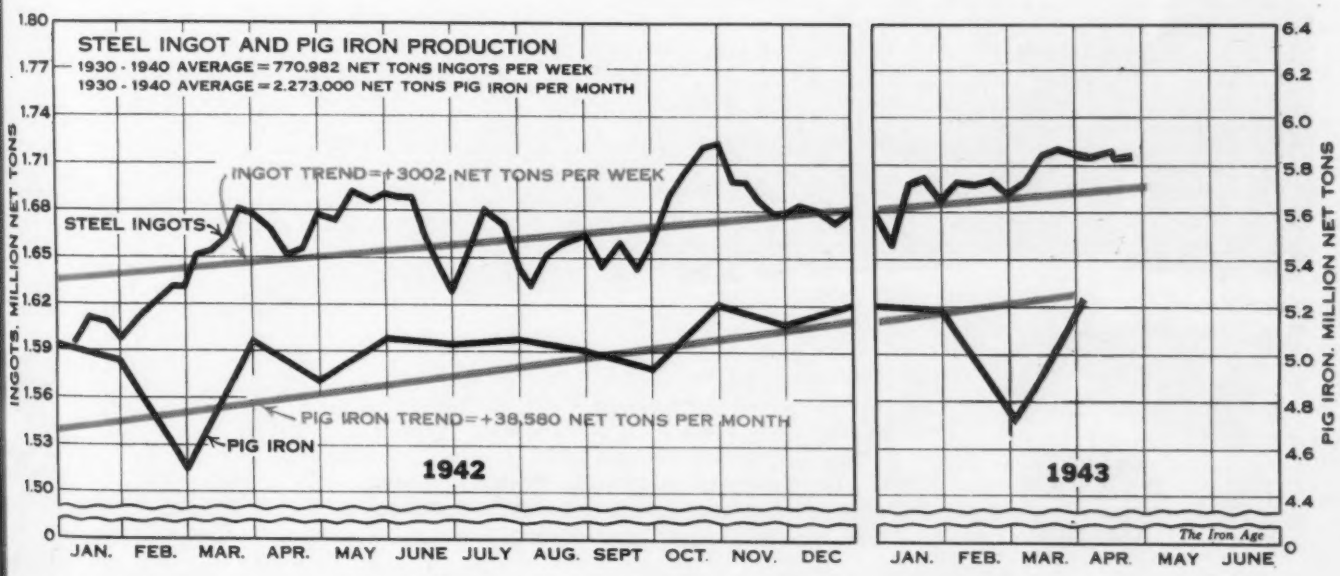
Experiments in Ersatz

New York

• • • The use by steel companies of nickel pigs resulting from copper refining residues is an interesting development which is being followed with interest in some circles over the nation. . . Confronted with the necessity of reducing the molybdenum content of hard-facing materials, producers voluntarily are experimenting to determine if they can maintain physical properties with less moly. . . Sintering New York State iron ore in cement kilns is being experimented with in the East, another current development of interest.

NATIONAL steel ingot production this week continues at 98.5 per cent of capacity, the year's lowest level. Pittsburgh operations have declined half a point to 100 per cent while Chicago output has fallen off two points to 98.5 per cent. Detroit is down one point to 107 per cent and the Eastern district has decreased production 10.5 points to 97 per cent. Philadelphia ingot output has increased one point to 94 per cent and Cleveland is up a full point to 99 per cent. Youngstown is unchanged at 95 per cent, Cincinnati at 103 and St. Louis at 106.5.

The Iron Age



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S. Ohio River	St. Louis	East	Aggregate
April 15	100.5	100.5	95.0	93.0	98.0*	104.5	88.0	100.0	108.0	102.0	103.0	106.5	107.5	98.5
April 22	100.0	98.5	95.0	94.0	99.0	104.5	88.0	102.0	107.0	102.0	103.0	106.5	97.0	98.5

*Revised

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A PORTER DIESEL is always on the job! With a Porter Diesel-Electric there's no such thing as Monday morning idleness — no time wasted firing up or waiting for steam pressure. A Porter Diesel is instantly ready at the touch of a button. With two power plants in the same unit, the locomotive is still available for light duty even if one is inoperative. A Porter Diesel has greater pulling power and better tracking features. And that isn't all! Because worn parts are easily and quickly replaceable, a Porter Diesel requires no long periods of idleness for major overhaul. A Porter Diesel needs no feed water treatment and no hostling. All these advantages and many more mean lower operating and maintenance costs for Porter Diesel users. Let Porter Engineers demonstrate to you the actual economies of operating Porter Diesels. Write for complete information today, mentioning the type of hauling job you require.

HEAVY DUTY FIFTY-TON PORTER DIESEL ELECTRIC

ARMY E NAVY

PORTER "Better Built" Locomotives
Established 1866

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES FOR INDUSTRY

H. K. PORTER COMPANY, Inc.

PITTSBURGH PENNSYLVANIA

Improvident Planning Flayed by Labor; Requests for Steel Far Exceed Supply

News of Industry

Washington

• • • **Labor sources** say that the period when the United States "will have so much steel it will be running out of our ears" won't come this year, but that it is possible that such a condition may come about in a short period after the end of 1943. When this occurs, arms for 11,000,000 men will have been produced. Moreover, visible evidence of munitions surpluses has labor leaders worried about the creation of isolated unemployment.

CIO President Philip Murray, speaking before a women's group in Washington recently, predicted that more than 650,000 workers will be out of jobs in three months. Mr. Murray's point was that overproduction and lack of shipping and warehouse space will cause the layoffs. The military commands finally call production halts after weapons have been overproduced, another labor leader said. Mr. Murray's suggestion that production be spread out to maintain labor forces and meshed with ship production was agreed to immediately by a number of executives.

"There might be sense in producing twice as many arms as can be shipped under existing conditions," one WPB official remarked, "but to produce four times as many arms as can be shipped in a year's time borders on stupidity."

Mr. Murray cited the case of a Berwick, Pa., tank plant, which employed 9000 workers at the peak of production, turning out a tank every 38 minutes. The Ordnance Department of the Army ordered this plant closed down with no provision made to take care of the workers, it was charged. When a labor representative queried Army officials about what new contract could be put into this plant to take care of its labor force he is said to have been told vaguely that perhaps some time in the fall the plant would be given a contract to make landing barges. Meanwhile, 9000 skilled workers are unemployed.

To prove how improvident Army planning has been, according to this labor representative, a prominent bomb manufacturer was permitted to make 5,000,000 aerial bombs of a particular weight and design, more than enough to supply the United Nations air forces for 10 years with this type. The Army will cut off about 6000 workers in this deal alone, it was claimed. Mr. Murray estimated that thousands of workers would have to be discharged from aircraft, small arms ammunition and gun factories; that 1,500,000 workers in the construction industry are either out of work or will be out of work shortly as a result of the government's stop construction orders. Two months ago, the steel industry stopped the fabrication of heavy steel beams, and from 18,000 to 20,000 workers will be dislocated or thrown out of work.

It is pointed out by labor officials that they agree it is wise to curtail munitions programs if over-production of any items threatens, but that the Army should cooperate with WPB, the War Manpower Commission and labor groups in reemploying workers. There is no attempt to make necessary contract cutbacks as painless as possible to the workers involved, labor leaders say. High Army officers, it is charged, have proved unsympathetic to pleas for cooperation by placing new contracts in labor surplus areas which have been created.

Meanwhile the intent of the military command is clearly seen in a report made by WPB Chairman Donald M. Nelson last Thursday. He declared that carbon steel requirements for the fourth quarter of 1943 were 20,830,000 tons of finished steel, while supply is only 14,400,000 tons. At least 75 per cent of this steel will go into direct military programs, it is estimated. This means that the Army and Navy have transmitted demands which contemplate a continuation of the record shattering production rate of American industry. Not only this, the steel demand is patently inflated, Steel Division officials say.

Not only should munitions production be geared to ship construction, but it should be geared to ship sinkings, one WPB official said. While the ship construction rate is known, ship sinking rate has not been made a matter of public record.

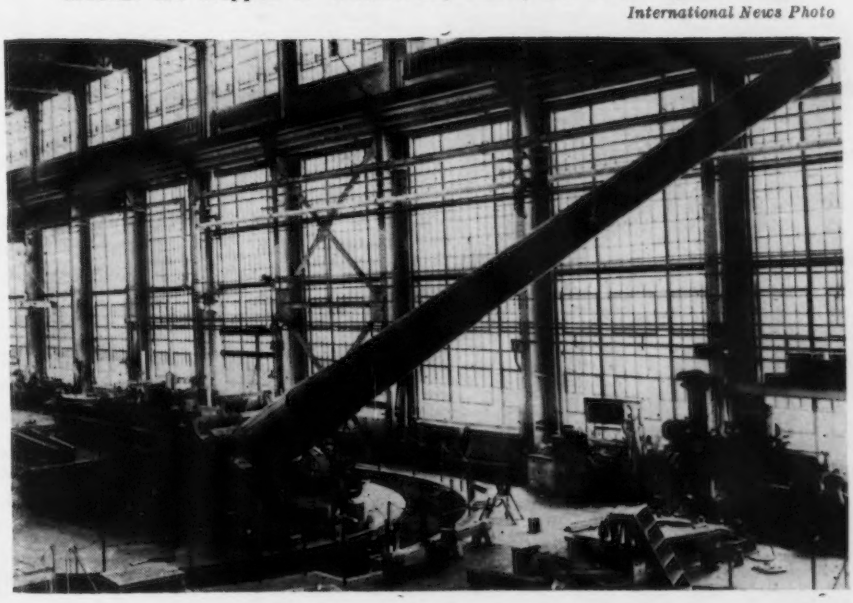
Army and Navy officials, labor representatives say, have made peculiar use of WMC's designation of certain areas where labor shortages are supposed to exist. Upon discovering which areas are so called, it is claimed, contracting officers of both services have canceled contracts in these areas and have transferred them to other less critical areas. The result, it is alleged, has been to create artificial unemployment.

WPB spokesmen have replied to Mr. Murray's charges regarding the prospect of mass unemployment by saying that they have been dealing for months to provide for conversion where a surplus production has occurred. Many contracts have been canceled or reduced, it was stated, and war facilities used for the production of other weapons for which there is an inadequate supply. The situation with respect to the Berwick plant of the American Car & Foundry Co., had been foreseen, it was stated, and the discontinuance of light tank production will interrupt work only temporarily.

It was declared that approximately $2,500,000,000 of contracts for making aircraft parts had been transferred to ordnance plants.

BIG BABY GETS A CRADLE: Great gun barrels made at the Watervliet arsenal are shipped to Watertown, Mass., for mounting in cradles.

International News Photo



Are Extra Charges on NE Steels Out of Line? Facts in Case Explored

Pittsburgh

• • • **The statement** heard at various times in trade circles that National Emergency Steel alternates have a higher alloy extra charge than the standard grades for which they are being substituted is not borne out by the facts. An analysis by THE IRON AGE indicates the statement is too general in nature.

Although the NE steel alternates could not truthfully be called first, second and third choices, the substitutions are set up in such a way that the least expensive, if available and suitable for fabrication by the customer, actually constitute a first choice. On this basis, checking the grades shown below in the table, it has been found that in the first list of alternates 51 of these have an extra which is less than the standard grade, nine have the same extra as the standard grade, and five have a higher extra than the standard grade.

Taking column No. 2 in the alternates, 24 cost less than the standard grades, one the same, and 29 have an extra which is greater than the standard grades.

In the third column, where there is not necessarily an NE steel recommended for all the standard grades, it has been found that 14 of these have an extra which is less than standard grades, and 21 cost more.

In all these cases, the steel industry has had nothing to do with the fact that the customer is unable to buy the standard grade. This is controlled by the WPB. Whether the customer can obtain or use the grades indicated in the first column is also not controlled by the steel industry. It may possibly be that the demand for the alternate grade shown in the first column is so heavy that the steel is either not available, or deliveries may be so extended that grades shown in column No. 2 or No. 3 may have to be supplied to meet the customer's production schedule.

The overall picture as indicated by the figures shown below, demonstrates that taking the total number of NE alternates, 64 per cent cost either less or the same (58 per cent less and 6 per cent same), while 36 per cent cost more. However, this is on a straight statistical basis. On a practical basis, it is obvious that the demand and the tonnage involved in column No. 1 of the alternates would greatly exceed the other alternates for the simple reason that most customers would obtain the cheapest steel.

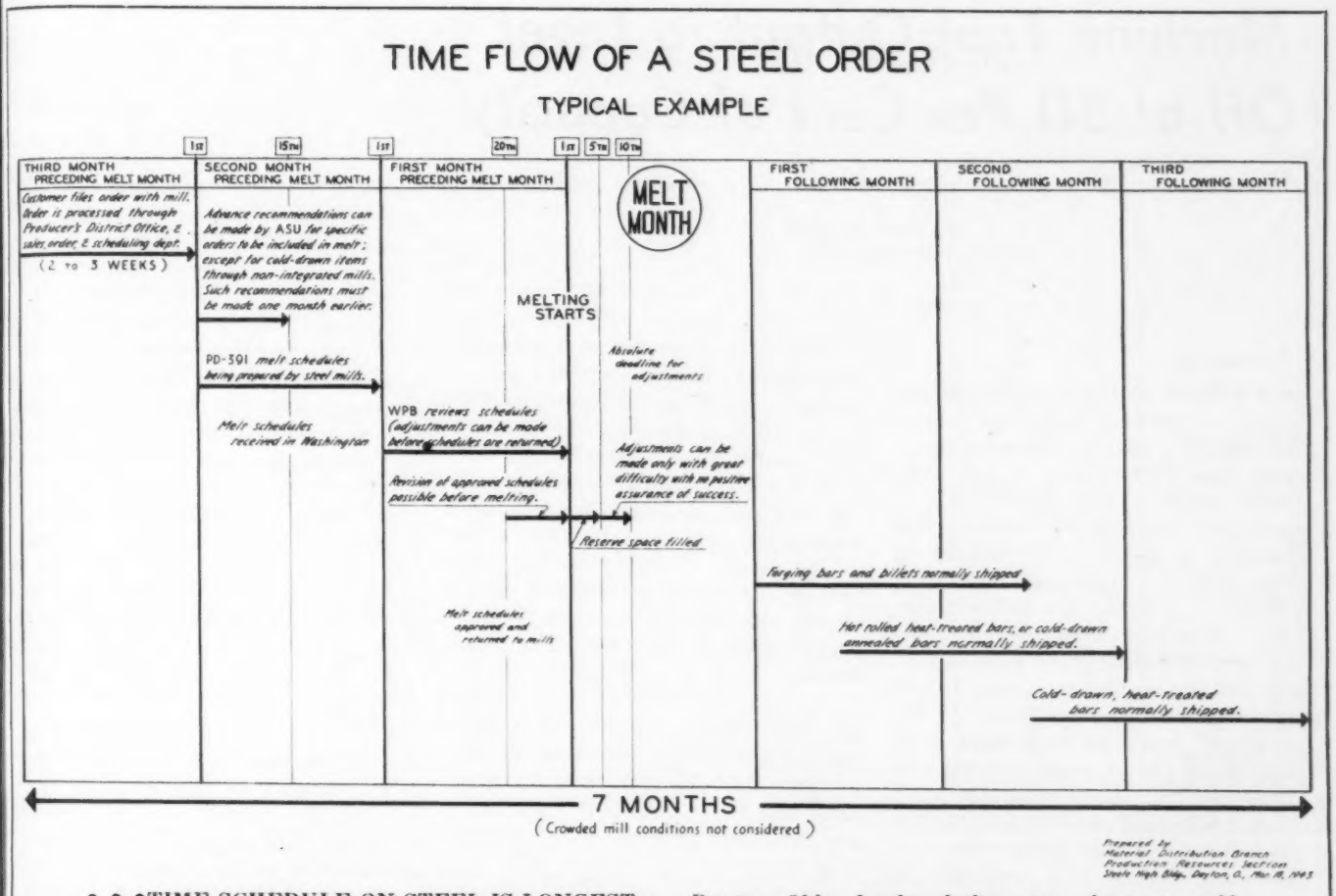
The higher price for the higher extras for some of the grades shown in column No. 2 and column No. 3 is due to the cost of the ingredients; such as nickle, chrome and moly. On the other hand, with the greatest number of consumers utilizing those substitutions shown in column No. 1, a considerable savings in price to the consumer over the cost of the standard grade is indicated.

The WPB and the steel industry have been spending considerable time on the NE steel picture and changes in the future would not be unlikely. It is known that the OPA is now studying a possible change in some of the NE steel extras. The study is said to involve the 9400 series, which might be reduced, and the 1300 series which might be revised upward. Such an action, if taken, would probably balance the demand for these grades in such a way that those customers forced to take the 9400 series would not be unduly penalized.

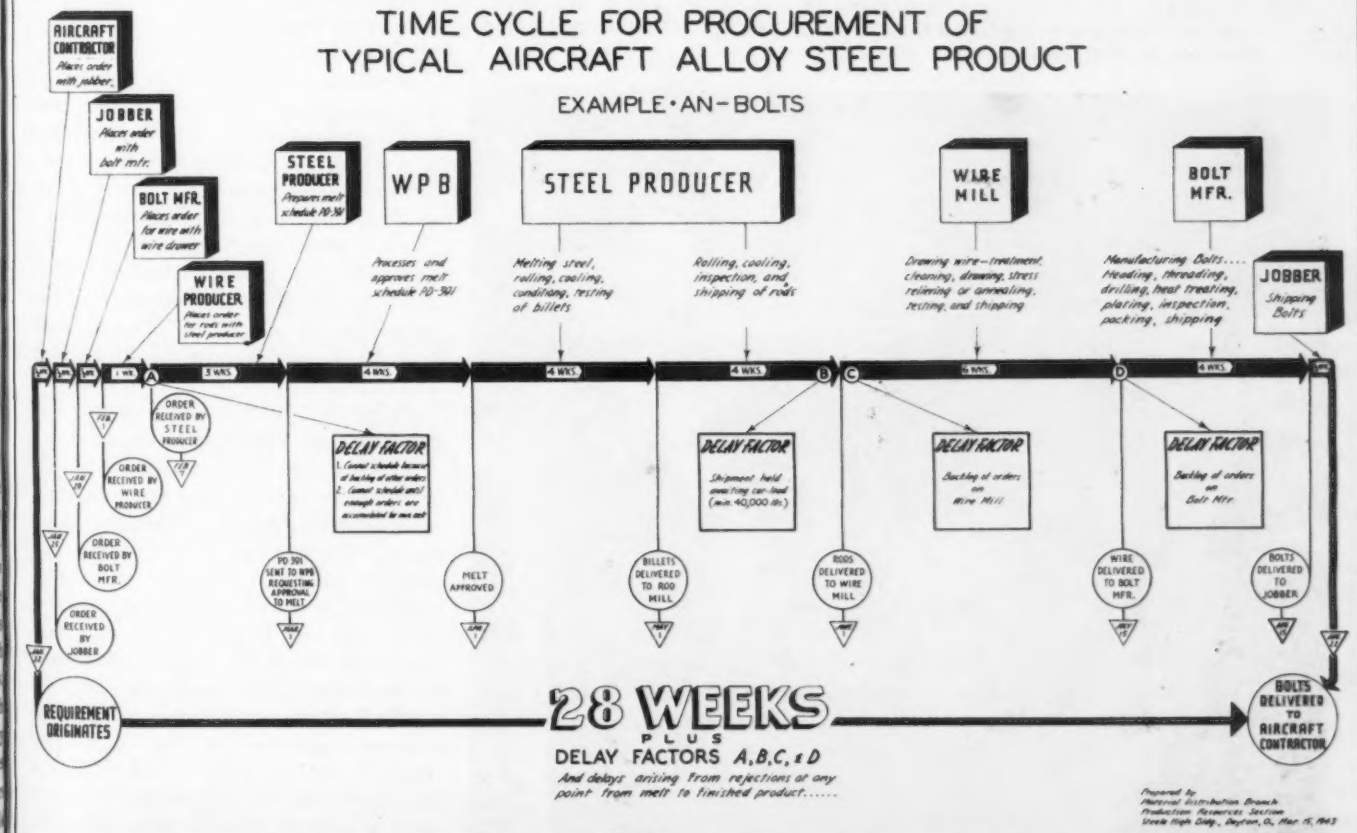
Alloy Extra Differences Between Standard Steels and Recommended National Emergency Alternates

STANDARD A.I.S.I.		RECOMMENDED N.E. ALTERNATES					
Grade	Extra (dollars)	Grade	Extra (dollars)	Grade	Extra (dollars)	Grade	Extra (dollars)
A-2317	$1.70	NE-8020	$0.45	NE-8022	$0.45	NE-9420	$0.80
A-2320	1.70	NE-8020	.45	NE-8022	.45	NE-9420	.80
A-3115	.70	NE-8020	.45	NE-9420	.80		
A-3120	.70	NE-8020	.45	NE-9420	.80		
A-4023	.45	NE-8020	.45	NE-8022	.45	NE-9420	.80
A-4024	.55	NE-8020	.45	NE-8022	.45	NE-9420	.80
A-4119	.60	NE-8715	.80	NE-9420	.80		
A-4615	1.20	NE-8715	.80	NE-9420	.80		
A-4620	1.20	NE-8715	.80	NE-9420	.80		
A-5120	.35	NE-8715	.80	NE-9420	.80		
A-6120	.95	NE-8715	.80	NE-9420	.80		
A-4027	.45	NE-8022	.45	NE-9422	.80		
A-4032	.45	NE-8022	.45	NE-9422	.80		
A-4120	.60	NE-8022	.45	NE-9422	.80		
A-4320	1.45	NE-8720	.80	NE-9422	.80		
A-4815	2.15	NE-8715	.80	NE-9420	.80		
A-4820	2.15	NE-8720	.80	NE-9422	.80		
A-2512	2.55	NE-8715	.80	NE-9415	.80		
A-2515	2.55	NE-8720	.80	NE-9422	.80		
A-2330	1.70	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-3130	.70	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-4037	.45	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-4042	.45	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-4047	.45	NE-1335	.10	NE-9435	.80	NE-9635	.80
A-4130	.55	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-5130	.45	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-6130	1.20	NE-1330	.10	NE-9430	.80	NE-9630	.80
A-2335	1.70	NE-1340	.10	NE-9434	.80	NE-9635	.80
A-3135	.70	NE-1335	.10	NE-9435	.80	NE-9635	.80
A-5135	.45	NE-1335	.10	NE-9435	.80	NE-9635	.80
A-5140	.45	NE-1340	.10	NE-9435	.80	NE-9635	.80
A-6135	1.20	NE-1335	.10	NE-9435	.80	NE-9635	.80
A-6140	1.20	NE-1340	.10	NE-9435	.80	NE-9635	.80
A-4137	.55	NE-1340	.10	NE-9637	.80	NE-9437	.80
A-4640	1.20	NE-1340	.10	NE-9637	.80	NE-9437	.80
A-3045	.50	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-3140	.70	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-4140	.55	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-4645	1.20	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-5145	.35	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-6145	1.20	NE-1345	.10	NE-9640	.80	NE-9440	.80
A-2340	1.70	NE-1345	.10	NE-9642	.85	NE-9442	.85
A-3141	.70	NE-1345	.10	NE-9642	.85	NE-9442	.85
A-3240	1.35	NE-1345	.10	NE-9642	.85	NE-9442	.85
A-4142	.55	NE-1345	.10	NE-9642	.85	NE-9442	.85
A-4337	1.85	NE-9537	1.20				
A-4340	1.70	NE-9540	1.20				
A-2345	1.70	NE-1350	.10	NE-9645	.85	NE-9445	.85
A-3145	.70	NE-1350	.10	NE-9645	.85	NE-9445	.85
A-4145	.55	NE-1350	.10	NE-9645	.85	NE-9445	.85
A-5150	.35	NE-1350	.10	NE-9645	.85	NE-9445	.85
A-6150	1.20	NE-1350	.10	NE-9645	.85	NE-9445	.85
A-2350	1.70	NE-9650	.85	NE-9450	.85		
A-3150	.70	NE-9650	.85	NE-9450	.85		
A-3250	1.35	NE-9650	.85	NE-9450	.85		
A-4150	.55	NE-9650	.85	NE-9450	.85		
A-4063	.45	NE-9255	.40				
A-4065	.45	NE-9260	.40				
A-4068	.45	NE-9262	.65				
E-52095	2.60	NE-52100C	2.60				
E-52098	2.60	NE-52100B	2.60				
E-52099	2.60	NE-52100A	2.60				
E-52100	2.60	NE-52100A	2.60				
E-52101	2.60	NE-52100A	2.60				
E-52107	2.60	NE-52100A	2.60				

Note: Extras are in dollars a 100-lb., basic open hearth. Electric steel is 50c a 100-lb. additional. Relationship between Standard Steels and N.E. Steels comes from Table II A.I.S.I. pamphlet No. 8, Sept., 1942.


TIME FLOW OF A STEEL ORDER
TYPICAL EXAMPLE
1st
15TH
1st
20TH
1st
5TH
10TH
THIRD MONTH PRECEDING MELT MONTH
SECOND MONTH PRECEDING MELT MONTH
FIRST MONTH PRECEDING MELT MONTH
MELT MONTH
FIRST FOLLOWING MONTH
SECOND FOLLOWING MONTH
THIRD FOLLOWING MONTH
Customer files order with mill. Order is processed through Producer's District Office, Z - sales order, & scheduling dept.
(2 TO 3 WEEKS)
Advance recommendations can be made by ASU for specific orders to be included in melt; except for cold-drawn items through non-integrated mills. Such recommendations must be made one month earlier.
MELTING STARTS
PD-391 melt schedules being prepared by steel mills.
Absolute deadline for adjustments
Melt schedules received in Washington
WPB reviews schedules (adjustments can be made before schedules are returned)
Adjustments can be made only with great difficulty with no positive assurance of success.
Revision of approved schedules possible before melting.
Reserve space filled
Forging bars and billets normally shipped
Melt schedules approved and returned to mills
Hot rolled heat-treated bars, or cold-drawn annealed bars normally shipped.
Cold-drawn, heat-treated bars normally shipped.
7 MONTHS
(Crowded mill conditions not considered)
Prepared by Material Distribution Branch Production Resources Section Steele High Bldg., Dayton, O., Mar. 15, 1943

• • •**TIME SCHEDULE ON STEEL IS LONGEST:** **The Materials Distribution Branch of the Production Resources Section of the Army Air Forces, under the direction of Lieut. Col. A. E. R. Peterka at Dayton, Ohio, developed these two charts to guide consumers in timing orders, and to impress upon them that steel has the longest production time cycle of any prime material.**


TIME CYCLE FOR PROCUREMENT OF TYPICAL AIRCRAFT ALLOY STEEL PRODUCT
EXAMPLE • AN-BOLTS
AIRCRAFT CONTRACTOR Places order with jobber.
JOBBER Places order with bolt mfr.
BOLT MFR. Places order for wire with wire drawer
WIRE PRODUCER Places order for rods with steel producer
STEEL PRODUCER Prepares melt schedule PD-391
WPB
STEEL PRODUCER
WIRE MILL
BOLT MFR.
JOBBER Shipping Bolts
Processes and approves melt schedule PD-391
Melting steel, rolling, cooling, conditioning, testing of billets
Rolling, cooling, inspection, and shipping of rods
Drawing wire—treatment, cleaning, drawing, stress relieving or annealing, testing, and shipping
Manufacturing Bolts.... Heading, threading, drilling, heat treating, plating, inspection, packing, shipping
1 WK
3 WKS
4 WKS
4 WKS
4 WKS
5 WKS
4 WKS
A
B
C
D
ORDER RECEIVED BY STEEL PRODUCER
ORDER RECEIVED BY WIRE PRODUCER
ORDER RECEIVED BY BOLT MFR.
ORDER RECEIVED BY JOBBER
DELAY FACTOR
1. Cannot schedule because of backlog of other orders.
2. Cannot schedule until enough orders are accumulated to run out
DELAY FACTOR
Shipment held awaiting car-load (min. 40,000 lbs.)
DELAY FACTOR
Backlog of orders on Wire Mill
DELAY FACTOR
Backlog of orders on Bolt Mfr.
PD 391 SENT TO WPB REQUESTING APPROVAL TO MELT
MELT APPROVED
BILLETS DELIVERED TO ROD MILL
RODS DELIVERED TO WIRE MILL
WIRE DELIVERED TO BOLT MFR.
BOLTS DELIVERED TO JOBBER
REQUIREMENT ORIGINATES
28 WEEKS
PLUS
DELAY FACTORS A, B, C, & D
And delays arising from rejections at any point from melt to finished product.....
BOLTS DELIVERED TO AIRCRAFT CONTRACTOR
Prepared by Material Distribution Branch Production Resources Section Steele High Bldg., Dayton, O., Mar. 15, 1943

Machine Tool Output to Level Off at 50 Per Cent of Capacity

o o o

By THOMAS E. LLOYD
Cleveland Editor

o o o

Cleveland

• • • **The activities of** individual machine tool builders during the balance of 1943, in a very conclusive manner, will mark the terminus of highly elevated machine tool production and point out the path for machine tool builders to get into other lines of war production. Because theirs was the job of preparing the United States and a large part of the United Nations for war, of necessity the manufacturers felt the war boom months before manufacturers in other lines. At the outset of hostilities in Europe, long before the United States entered the war, the industry got started on a wartime production scale which steadily increased in tempo during the past five years until in 1942 production of machine tools was valued at $1,320,000,000.

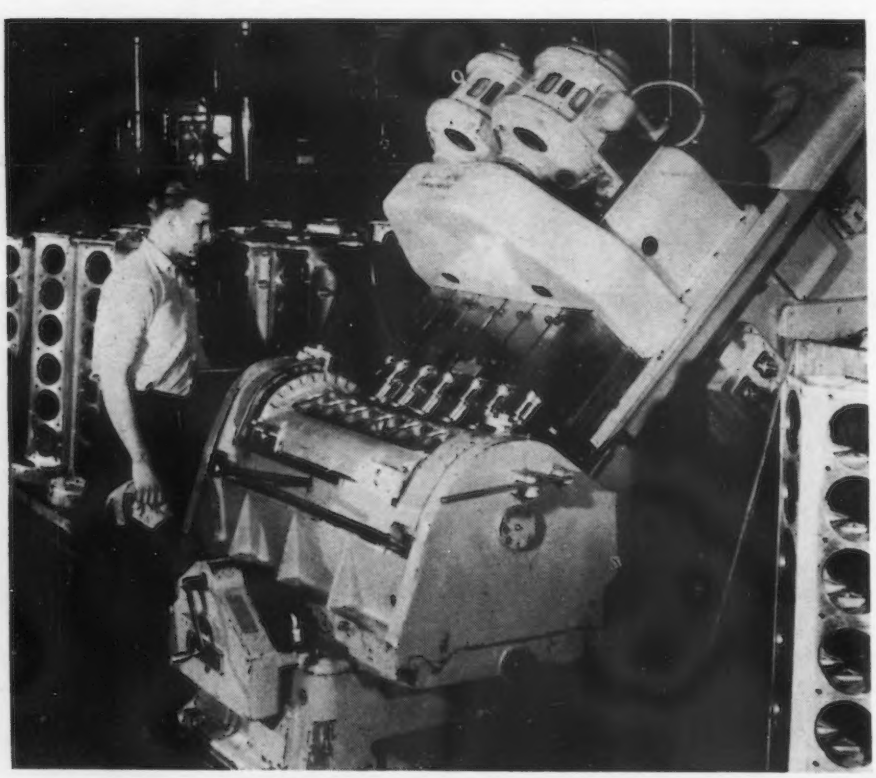
Because production of armament items and the equipment of the greatest war machine in the history of the world depended upon getting production machinery into war plants all over the country, the machine tool industry had to and did get under way quickly and efficiently. By virtue of the nature of its production, the industry has about reached the point where, with most of the nation's war plants equipped and operating at peak capacity, high rates of production in the machine tool industry will slacken off. This point has not yet been reached and will not come suddenly. However, 1943 is expected to see machine tool builders looking about for new business to keep their plants busy.

It will not only be the smaller builders that will be out hunting new business, but some of the big names in the industry will likewise be faced with this task. Manufacturers building standard tools, such as engine lathes, millers, planers and similar items, are likely to be first affected, quite possibly during the summer months, while the builders of special machinery will likely carry through at high production rates until as late as January or February of 1944. However, the bulk of machine tool builders do see the end of elevated production rates, and determined that no machine tools will be built that are not required by the war effort, they plan to devote productive capacity to the manufacture of war materials, primarily on a subcontract basis. While there are growing rumblings of dissent that markets are flooded with machine tools, these cases are for the most part the result of specific government claimant agencies attempting to take care of their individual requirements in advance of actual needs.

In substantiating the expected curtailment of machine tool production, it is necessary only to look at the statistics of machine tool production, new orders and unfilled orders. During 1942 the average monthly shipments of machine tools were valued at about $110,000,000 for the industry, with the year's shipments having a total valuation of $1,320,000,000. Peak shipments were reached in December, when $132,000,000 worth of tools went into the maws of the United Nations' war machine. By that time, much of the expansion in the industry was completed and tooled, and the industry as a whole had in operation the greatest productive capacity in its history. In December, one company alone had in production plant capacity that was 140 per cent greater than in 1939, and this was the rule rather than the exception in the industry. Consequently, it was more a job of getting and training personnel to build the tools rather than finding space and machinery on which to build them.

The industry did not carry through at its peak rate during the first two months of this year. In January, shipments slumped to $117,400,000, and dropped again in February to $114,000,000. Just where this downward trend will end is difficult to say, but it is expected by informed observers in the industry that a plateau will be reached at about 50 per cent of the present capacity of the industry, which is estimated to be about $50,000,000 to $60,000,000 worth of business a month. New orders are ex-

THE SPECIAL PURPOSE machinery builders in many cases find their backlogs sufficiently high to carry them at peak production until after the turn of the year.



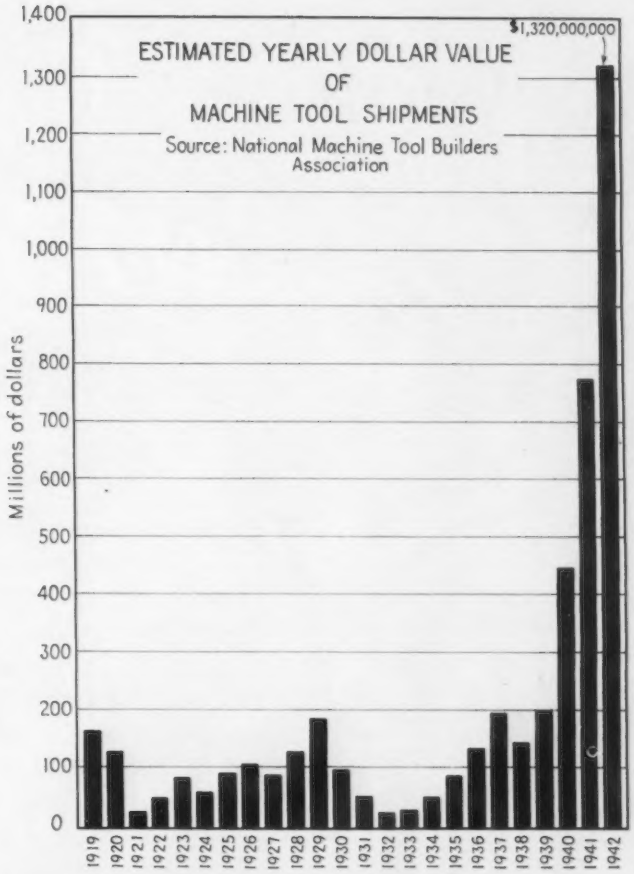
pected to keep production at this rate throughout the remainder of the war. This does not take into consideration any grand scale change in the methods and mechanism of warfare, a possibility that seems remote.

Meanwhile, with the current tapering off of new orders, there has been a gradual cleaning up of industry backlogs. Machine tool order backlogs reached a peak in July, 1942, and have been gradually whittled down until at the end of 1942 the backlogs were only 81 per cent of the July valuation, and by the end of February, 1943, it had been cut to about two-thirds of the July peak.

This reduction of backlogs, when it became apparent, led to some ill-conceived and perhaps false prognostications. First, it threw up the scale that the industry had reached the end of the line and was about ready to close up shop, and second, it led to an attempt to hold back on production so as to prolong what business there was available. Even though backlogs can be cleaned up, new business today is substantially higher than it was before the war and it will keep the industry operating at a comfortably high level. Furthermore, there is a need for war products that is so acute in many spots that the facilities of the industry can be of great value to the war effort, even though machine tool production might drop off.

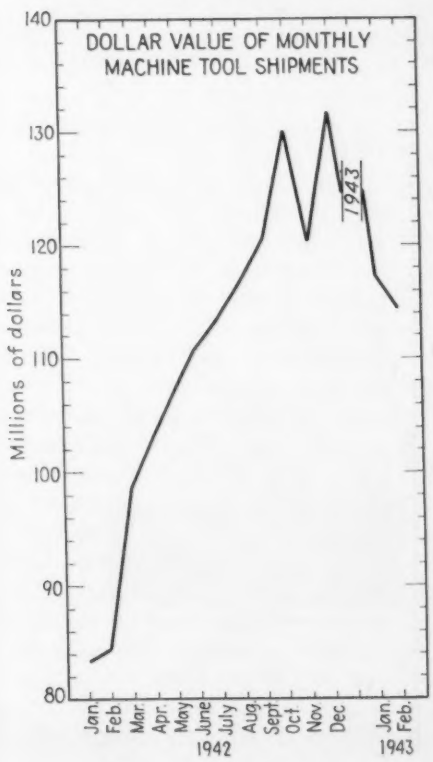
It is true some of the machine tool building capacity may be idle, but for the most part the idle capacity will consist of the high cost operations and any margin of idle capacity that may exist can be used in eliminating costly subcontracting. Extensive subcontracting is a war measure with the machine tool builders, and if this were eliminated more work would be done in the builders' plants. Furthermore, it is becoming more apparent that a cutback in production will result in any case because of the growing manpower shortage in the industry. The manpower problem has caused considerable trouble in the past six months, because heavy drafting has removed highly skilled men from the industry and training of new men and women cannot efficiently keep pace with the losses. It is expected that before the end of 1943, 70 to 75 per cent of the machine tool workers of draft age will be drawn from the builders into the armed services. Drafting of workers, causing an involuntary limiting of production, may fit well into the curtailment of operations when machine tool needs are not so acute.

Because of the global character of the war, in addition to the $50,000,000 a month machine tool requirements of the United States, there may also be substantial business from allied nations. At present, both Great Britain and Russia would take machine tools in far greater quantities than they are now getting them if such sales were authorized. How long this extra demand will hold up is unknown, but it is a factor to be considered. Also, a quickening of the tempo of war in the air has extended the requirements for production machinery, and proposed further expansions of aerial warfare may be a vital factor. Likewise, certain gun programs have been or are about to be expanded, requiring greater numbers of machine tools, and there are other armament items for which production programs must be advanced or held at high levels. These will require new machine tools to make advanced schedules possible, and also replacement tools for many that are wearing out. While many machinery transfers are being made from programs that are cutback to those



THE YEARLY ESTIMATED DOLLAR VOLUME of machine tool shipments, which includes only power-driven machine tools that cut metal in the form of chips. Estimates for 1919 to 1925 are based on new orders representing about 60 per cent of the industry; 1926 through 1940 on shipment reports of about 85 per cent of the industry; and the 1941 and 1942 estimates from WPB data based on 95 per cent of the industry.

THIS MONTHLY SHIPMENT report based on dollar value of shipments indicates the steady climb of shipments as new machine tool building capacity came into production during the war. The fall-off during the first two months of 1943 is due to the cleaning up of backlogs of orders and the lower volume of new orders coming in. Backlogs were at the highest point in July, 1942, but dropped to 66 per cent of this amount by the end of February.



Recovery Complete

The scarcity of new tools for civilian use grows increasingly acute. The only answer to this emergency shortage is to properly care for the tools we have and to repair potentially useful tools that have been discarded. Millions of dollars worth lie rusting in cellars, workshops and factories. Most of these could be put back to work for a fraction of their original cost. Most of these tools are of good quality and are simply the victims of carelessness or abuse. To put them into good working condition would cost on the average not more than one-fourth of their original cost. Repair parts are available. In many cases, no parts are needed or by combining parts from several tools a completed working tool will result.

Efficient, workmanlike tools are vital weapons of defense on the home front. Let's put our discarded tools back to work, while we can. We are going to need them desperately. Neglect now means deprivement later.

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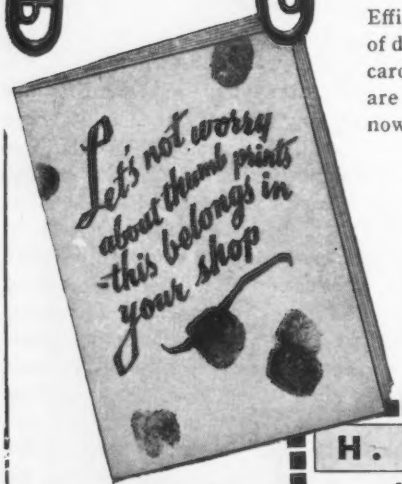

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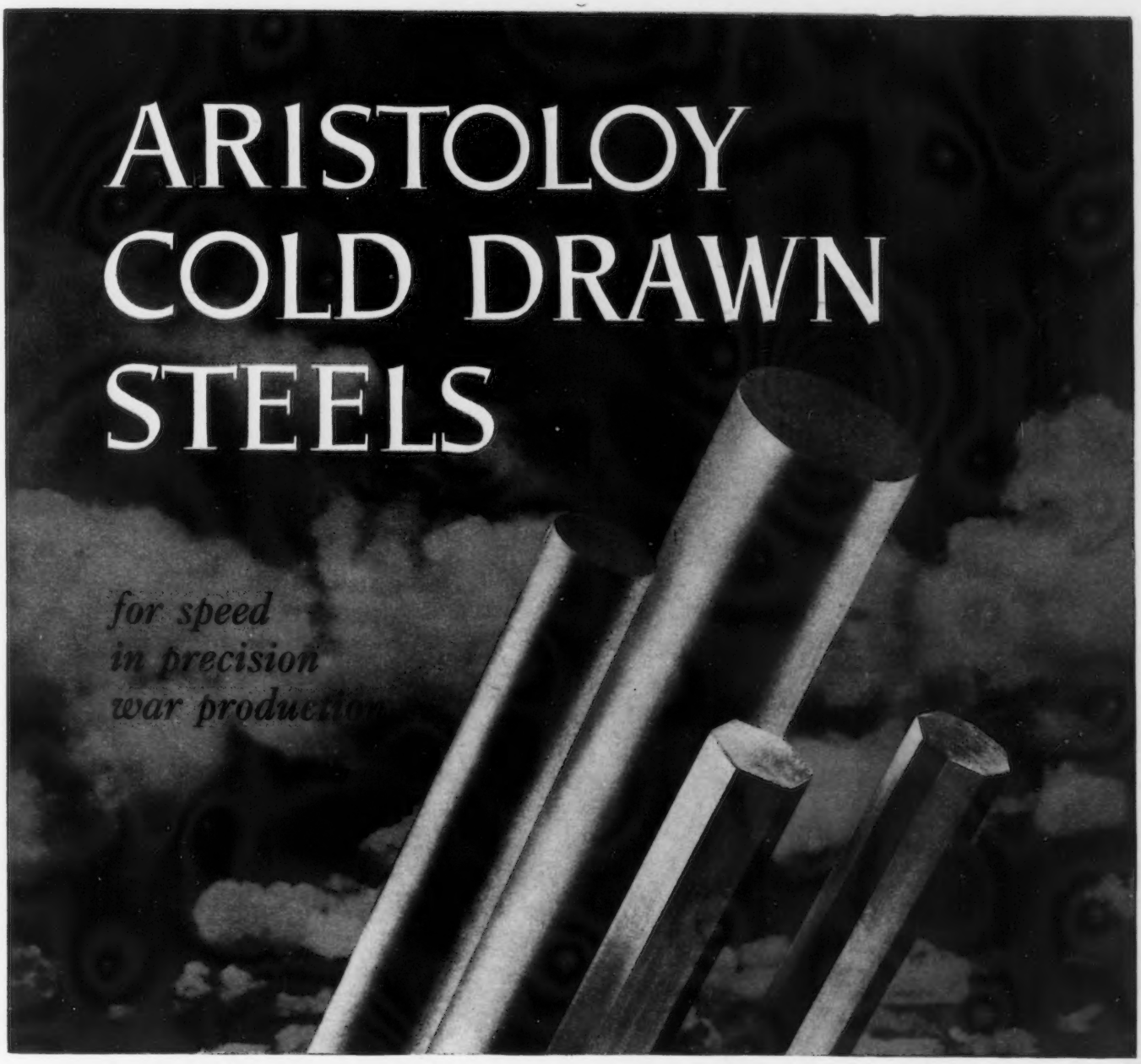
that are expanded, there is always the new demand for special-purpose equipment.

There is also another customer that may come into the picture when deliveries of machine tools become reasonable. That customer consists of the many manufacturers of war goods that months ago took any equipment they could lay hands on when war contracts called for immediate operation. Frequently, these manufacturers took equipment that was not entirely satisfactory, but took it because it was all that was available at the time and immediate production was vital on the contracts held. The production possibilities of the equipment might have been inadequate; it may have been too small or too large for the work to be done; or, occasionally, it was not built to close enough tolerances for the work. This customer may begin soon to come into the market to bring his plant up to peak production and efficient operation since better deliveries of the desired equipment can be made by the builders. Of course, much of this buying depends upon whether or not the government will permit it.

To pick a time during the coming 10 months and say that "this will be the date that the machine tool industry will catch up on all its backlogs and be dependent upon new orders" would be foolish. Some builders at present have backlogs that will carry them only through July or August, while others will carry on a peak production until after the turn of the year. Generally, the standard machine builders will run out their string first, with the special machinery builders following along at a later time.

With the fall off in production, there will be likewise a tapering off of material requirements. This has, in some instances, become already apparent, but for the most part is still quite spotty. At present there are shortages of anti-friction bearings, electrical equipment, steel tubing, alloy steels and forgings, pretty much in that order. Because builders were placed in the Class B category under CMP, they have come in second best on material allotments, with Class A items getting top preference. Consequently, when builders sought to purchase controlled materials they found that mill schedules were filled up to such an extent that it was difficult to get orders accepted. The Tools Division of WPB has done and is do-



Cold Drawn Steels have the vital wartime job of keeping fast automatic production machines operating continuously at peak loads. The uniform surface and close tolerance of Aristoloy Cold Drawn Steels assure smooth machining with longer tool life and uninterrupted production.

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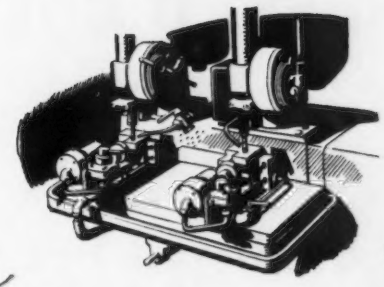
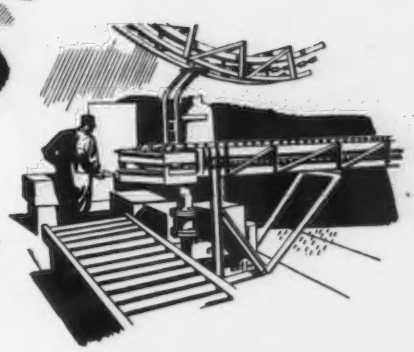
No one example can tell the complete story, for these systems are not "package" propositions; each is engineered to fit some specific need. But one important current application may suggest the possibilities.





Already installed on a number of vessels, these W·A·B Remote Control Systems place command of all engine maneuvering directly under the thumb of the operator. Control—from stations located on the bridge, in the engine room, or both—is almost as centralized and simplified as the control of your car. Both speed and precision of response are greatly increased.

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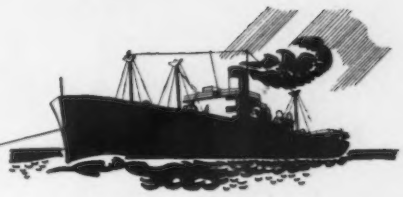

You can tell, better than anyone else, where W·A·B Remote Control Systems might fit into your plant or product. In many instances, standard "off the shelf" W·A·B devices provide a complete solution to control problems. Our representatives will be glad to cooperate in applying W·A·B experience to the development of a system engineered to meet your specific needs. Write, wire or phone.

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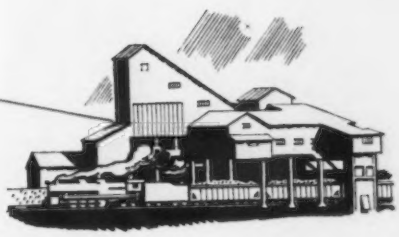

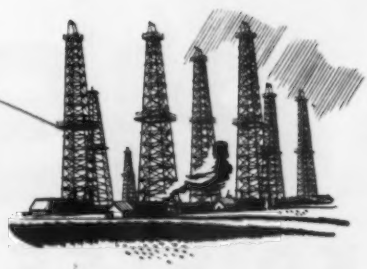

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The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

We have ***turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.***

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative

F. Somers Peterson Co., 57 California St., San Francisco, California

Revised Steel Price Annual Index Issued

• • • **Because the years 1941, 1942 and 1943 have been abnormal as far as the types of steel products consumed are concerned, THE IRON AGE weighted finished steel price index for these three years has been revised. Each price making up the annual index is now weighted according to the tonnage sold during the year, making the new index for 1941 2.43078c. a lb. and for 1942 2.26190c. a lb. The tentative index based on expected consumption of finished steel products for 1943 has been set at 2.25513c. a lb. When actual data on the consumption of finished steel products are available, the current quotation will be corrected.**

The prices reported heretofore were revised in August, 1941, and were weighted in direct relationship to the tonnage sold during the decade 1930 to 1940. The 10 major classifications selected were: Hot rolled strip, cold rolled strip, bars, plates, structural shapes, hot rolled sheets, cold rolled sheets, wire, rails and pipe. A detailed account of the procedure followed in arriving at the new sensitive index and a recapitulation of the indexes going back to 1929 appeared in the Aug. 28, 1941, issue of THE IRON AGE.

ing yeoman service in this regard. While the industry has been cut in its requirements, through the efforts of the Tools Division, urgency jobs were supplied with adequate materials to meet program needs.

However, in buying materials, some machine tool builders have found that already requirements have started to ease off. This is evident now because materials are ordered well in advance of actual needs so that they will be on hand when work commences. Consequently, those builders who will clean up their backlogs in the next four or five months are now curtailing purchases. As pointed out, this condition is not general, and builders with larger bookings of unfilled orders have not yet reached this restricted buying stage.

When the machine tool industry reaches its expected production level of $50,000,000 to $60,000,000 worth of tools a month, there is no doubt at all that other lines of production will be attempted by the builders. In builders' plants are machinery and equipment that can be used for production of war goods with no conversion neces-

AND NOW!

H-W MAGNAMIX

A Ramming Mixture of Washington Magnesite

FOR

BASIC OPEN-HEARTH & ELECTRIC STEEL FURNACE BOTTOMS

The widespread introduction of H-W Magnamix into steel plant practice was of necessity delayed for more than two years pending the completion of long range plans for increasing the production of domestic magnesite. During the interval the promise shown by chemical and physical tests in the course of laboratory development has been confirmed in actual service, first in basic electric steel furnace bottoms and, more recently, in the bottoms of basic open-hearth steel furnaces. The same degree of confidence may be placed in H-W Magnamix as in the many other Harbison-Walker products which are so well established throughout the steel industry.

COMPOSITION

H-W Magnamix contains approximately 80 percent of magnesia, largely in the stable crystalline form periclase, which accounts for its high refractoriness. It is installed as received save the addition of water. The high magnesia content is not diluted by the addition of furnace slag.

QUALITY

Laboratory control and constant supervision of manufacture insure uniform quality and excellent working properties.

PREPARATION

H-W Magnamix requires only the additon of five to six pints of water per 100 pounds to bring it to the consistency of damp foundry molding sand which is ideal for ramming purposes.

STRENGTH

Furnace bottoms of rammed H-W Magnamix after drying have a density of 165 to 170 pounds per cubic foot, a crushing strength of over 1500 pounds per square inch, and a modulus of rupture of over 350 pounds per square inch.

ECONOMY

H-W Magnamix hearths are rapidly installed with common labor. Complete open hearth bottoms have been placed at the rate of over two tons per hour with less than five man-hours of labor per ton. The ramming of an H-W Magnamix bottom may begin immediately upon the completion of a furnace roof and proceed simultaneously with the construction of ports and end walls, and repairs to regenerators. The desired contour of the hearth and the working surface are established completely before any heat is applied. The furnace refractories are spared the severe treatment to which they are subjected in furnaces with bottoms sintered into place in successive layers.

H-W Magnamix is shipped dry in sacks of 100 pounds each. Shipments are made in full carloads or in mixed carloads with H-W Magnesite, H-W Chrome, H-W Improved Metalkase Magnesite, Magnex, Chromex or Forsterite brick.

TRADE MARK

REG. U. S. PAT. OFF.

HARBISON-WALKER REFRACTORIES COMPANY

and subsidiaries

WORLD'S LARGEST PRODUCER OF REFRACTORIES

GENERAL OFFICES · PITTSBURGH, PENNSYLVANIA

Camouflaging Many a Battery

KEYSTONE Wire

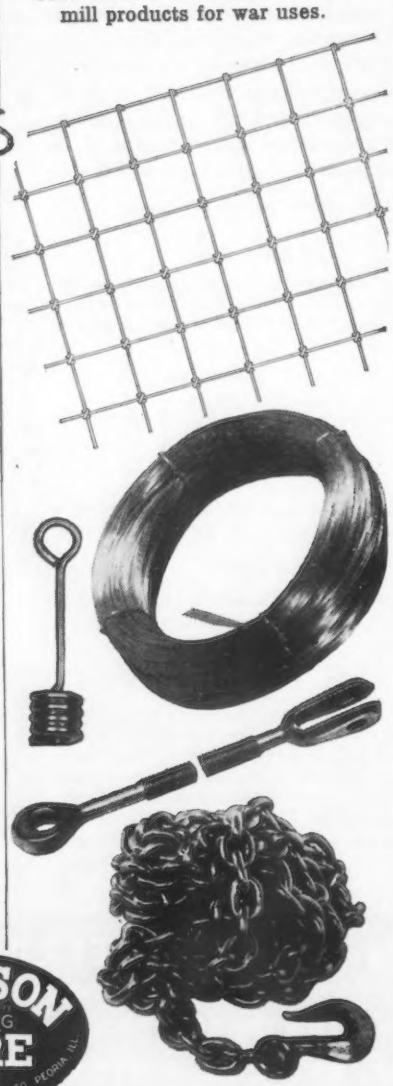
The enemy never locates many a well placed battery which is blasting him backward. That's where today's highly developed art of camouflage scores heavily. And many tons of wire fabrics lend ease, speed and thoroughness to the camouflage expert's capable hand.

Each artillery unit thus concealed contains many parts made of wire mill products, too. The same is true of planes, ships, tanks and ammunition. These examples indicate why Keystone's productive facilities are "drafted until Victory".

And when Victory begins to shine clearly through the smoke of war, some appreciable production released for civilian uses may be anticipated.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Just a few of thousands of wire mill products for war uses.



Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

sary. These are high grade production machines that are used normally to build production machines, and there is no reason why they cannot be utilized in producing war materials. Some companies have already started experimenting with producing parts and equipment on a subcontract basis. Warner & Swasey, in Cleveland, has taken an experimental order for marine diesel engine parts; Van Norman at Springfield, Mass., is producing a line of induction heating furnaces; R. K. LeBlond, at Cincinnati, is doing some production work, and several others in the field have similarly sought new lines of production.

That a concerted and organized effort has not yet been made to line up a program of production of war materials by these machine tool builders as their machine tool contracts expire is somewhat disappointing. It is fairly well known that the industry will be wanting more work shortly and it is also well known what it can do. A coordinated and organized program that would show individual companies what is wanted, when and where, would facilitate getting these companies into war production quickly and efficiently. Here is an industry that can go into production work almost at a moment's notice, and it is being left up to the members themselves to go out and find ways and means of utilizing valuable production equipment. So much more could be done if the problem was attacked from an all-industry standpoint.

Whiteside Made Head Of Civilian Requirements

Washington

• • • **Arthur D. Whiteside,** Westport, Conn., former head of the OPM Iron and Steel Branch, has been appointed vice-chairman of WPB in charge of civilian requirements and will report direct to Chairman Donald M. Nelson.

Selection of Mr. Whiteside to take charge of civilian requirements in WPB is interpreted as a move by Mr. Nelson to retain and strengthen WPB jurisdiction over this kind of production, which is a source of controversy. Senator Maloney of Connecticut is vigorously pushing a bill to establish a separate office, independent of WPB, to take charge of all civilian requirements. It is because of his support of that measure that Joseph L. Weiner, former WPB director of civilian requirements, left his post.

SHIP, CAPTAIN AND CREW

UP IN THOSE CLOUDS enemy bombers are hunting them. Behind, an Axis submarine trails them toward the setting sun. There's a hurricane brewing. Bravely they steam along.

Providence be with this valorous gambling team—ship, captain and crew. On trips of peril they plow on, delivering the goods of war, thoughtless of self. The jobs these merchantmen perform to save democracy rank with the noblest exploits of American pioneers. We at home should do more to pay them tribute, help them win, by working harder, giving more for bonds of Victory!

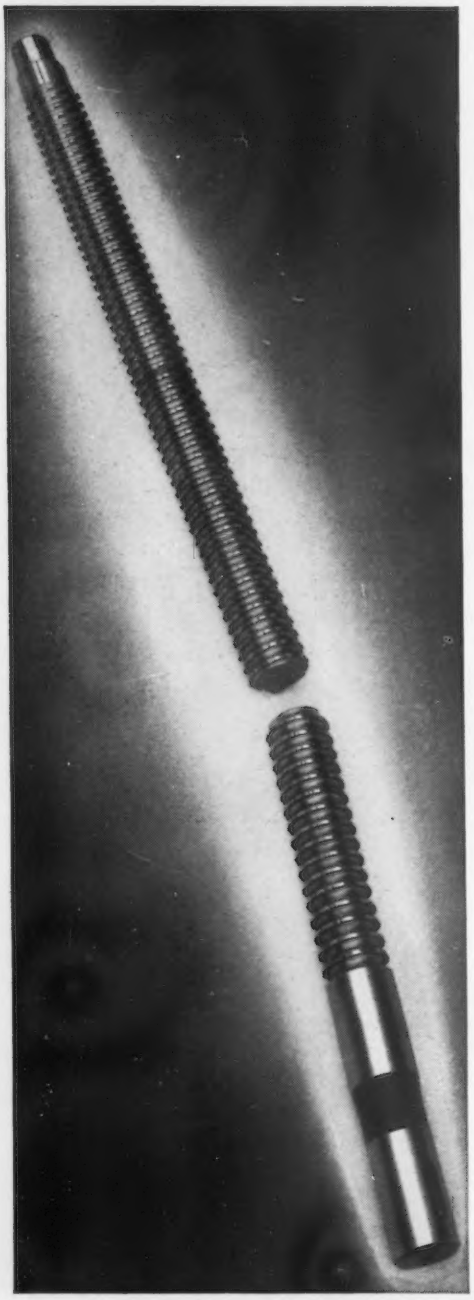
* * *

Castings for this ever-growing fleet of merchantmen are part of Continental's war production. In addition, Continental Rolls, in mills throughout America, are rolling the steel plate that goes into these ships. Thus, in war, our work at Continental is doing a job we prepared for in peace. In the manufacture of steel castings our production is among the largest in the country. Over twelve years ago Continental pioneered the High Production Rolls used today for all high-speed strip mill operation.

CARBON AND ALLOY STEEL CASTINGS • ROLLS • ROLLING MILL EQUIPMENT • SPECIAL MACHINERY

CONTINENTAL
ROLL AND STEEL FOUNDRY COMPANY
CHICAGO • PITTSBURGH

2 SECONDS
would have saved this broach . . . . .



It may take 100 days to get a new one

How to get more production with your Broaches------

4. BY PROPER ALIGNMENT

It only takes a second or two to make sure that the piece to be broached is PROPERLY AND SECURELY seated in the fixture.

When parts are not securely seated they may "jump" into place while the broach is moving. If this happens the part tends to "cock" and jam against the broach, frequently resulting in tooth breakage if not breakage of the broach itself.

And, when you are broaching a cored or forged hole from the rough, it is safest to use an equalizing fixture to avoid localized high tooth loads tending to force the broach out of alignment.

For the same reason, a drilled hole should be square with the face or surface of the part against which it is located in the broaching fixture.

Simple precautions such as these will enable you to reduce broach breakage, reduce tool costs, and avoid production tie-ups.

Write for a copy of "Broaching News" Vol. IV, No. 8 for further details on "How to Get the Most Out of Your Broaches".

colonial BROACH COMPANY

Broaching Machines *Broaches-Broaching Equipment*

DETROIT . . . . . U. S. A.

Stir Over Steel Plate Inspection Brings Reply from Truman Committee

Washington

• • • **The lively stir** over steel plate inspection whose rigidity since the recent hearings before the Truman Senate Committee in the Carnegie-Illinois Steel Corp. case is alleged to have caused a sharp drop in production, brought a report to the Senate Monday afternoon from the committee, which said that unless purchasing agencies find it safe to reduce specifications the committee and all other government agencies expect that the steel plate will be in accordance with specifications.

Borderline cases, the report pointed out, should be referred to the purchasing agencies for a determination by them as to whether they can accept standard steel. It was added that such steel should be so marked and used only in those places where it is subjected to less than average strain.

The Senate committee report came on the heels of a hastily called meeting last Saturday of government and steel industry officials, held with WPB Iron and Steel Division Director H. G. Batcheller, which discussed clarification of testing practices for steel plate. Taking its cue from a telegram sent to plate mills last Friday by WPB Chairman Donald M. Nelson, the meeting devoted itself to setting up inspection procedures that would assure maximum plate output without lowering specifications and tolerances. In his telegram Mr. Nelson, while recognizing the importance of vigilant inspection, warned that it would be disastrous to the shipbuilding program if serviceable plate should be rejected in such volume as to diminish the quantity which can be delivered to the yards. That absolute uniformity rarely is attainable, however, is realized by the armed services, the Maritime Commission and WPB as Nelson pointed out in his telegram.

The meeting set up a smaller group, consisting of representatives of the Navy and War Departments and the steel plate industry which will formulate specific proposals to be submitted at a conference to be called later.

Admiral E. S. Land said that present difficulties have been created largely by the emphasis on speed of production and urged that Army, Navy and Maritime Commission inspectors be instructed to continue with inspection practices which have been followed in the past. The service representatives made it clear that everything possible would be done to eliminate testing requirements or stipulations which might unnecessarily delay deliveries.

Referring to recent rumors, which it said were "probably instigated by the company, that high government officials condoned the action of the company," the Senate committee said it could find no official "who even suggests such a thing, although carelessly worded remarks and private utterances have created some confusion." The committee said that President Fairless of United States Steel Corp. had admitted that the company was guilty of 'very, very poor management.'

Mr. Fairless issued a statement April 19, saying the company reiterates the statements which witnesses made at the committee hearings that the plates furnished by the Irvin Works of Carnegie-Illinois are entirely suitable for their intended uses for shipbuilding purposes, despite irregularities in the testing of a small percentage of the plate production of this plant.

"As brought out by the testimony," he said, "these failures on the part of a few employees to follow Carnegie-Illinois' prescribed testing procedures primarily concerned relatively small variations from specified minimum tensile strengths in a product, where the margin of safety is three or four to one. The testimony relative to irregularities in the recording of some chemical analyses did not affect the quality of the steel. No evidence was introduced that the steel had not been properly tested for chemistry at the place of its manufacture.

"Action has been taken to remedy all such irregularities at Irvin Works. . . . There is no proper basis to characterize these plates as defective or faulty, or to question the safety or suitability of these plates for shipbuilding purposes.

"At a meeting at the WPB on April 8, 1943, an official of the Maritime Commission stated that although the tests of some plates at Irvin Works fell slightly below the specifications, the material would have been accepted, had the deviations been reported to the Maritime Commission.

"Carnegie-Illinois has never stated that it will be unable to maintain its plate production if it is required to conform to existing specifications. It has taken the position, however, that if plates of lower tensile strength than now specified are fully suitable for shipbuilding purposes, then in the interests of maximum production of a much needed war material, existing specifications should be modified to secure that maximum production, especially from converted strip mills such as Irvin Works."

The committee said that where elements of judgment exist, such as in the inspection by visual examination for ripples and lamination, it agrees with Mr. Nelson that care should be taken to exercise the judgment properly and not be unnecessarily rigid. This, the report declared, does not apply to chemical and physical tests that are capable of exact ascertainment. Where doubt exists, the committee said that a second test should be made.

"If there is a second failure, but by a very slight margin, the failure should be reported to the purchasing agencies and their instructions followed," the report said. "Substandard steel plate should be paid for as such." The committee further said:

"It has been suggested by steel company officials who have resorted to gossip and rumor, but who have not authorized the use of their names, that there may be a 35 per cent steel slump because the committee has required the Carnegie-Illinois Steel Corp. to be honest. Consequently, the committee is asking all producers of steel plate, which fail to produce as much plate in April as they did

ENEMY'S LOSS: One of the largest vehicles captured during the African campaigns, this Mércedes-Benz was probably used by Germans as a troop-transport and especially made for desert warfare.

International News Photo

in the same amount of working time in March, to report to the committee the extent of any slump in their production which they attribute to the requirement that they comply with government specifications. The committee will obtain the full facts with respect to any such instances reported to it.

"The committee has recommended to all suppliers of government materials that they check their inspection procedures. It is useless to waste thousands of men and millions of dollars in inspections unless they are honestly made. The committee will accept no excuse for fraud upon the government in matters relating in any way to the safety of our soldiers and sailors.

"Mr. Nelson has telegraphed all companies asking that in determining questions of judgment, where reasonable men might properly differ, the inspectors should not be too strict. Mr. Nelson desires to make it clear that the telegram did not mean that specifications subject to exact ascertainment should be disregarded, he has requested the committee to include in its report a statement that he has read and concurs in the report."

In dealing with the alleged "fake" chemical and physical tests, the report is inconclusive. For, instead of proving that Carnegie-Illinois has failed as a result of the misrepresentations, the committee intimates that if it is discovered that Navy specifications on tensile strength can be safely reduced, it would approve the reduction.

"The committee believes that if the specifications of the Navy department and the Maritime Commission are unduly high. It is pointed out by steel men that if the Navy reduces its tensile strength specification from 60,000 lb. to 58,000 lb. the Truman committee's case will fall of its own weight because the committee was forced to reluctantly admit that Navy tests showed Carnegie-Illinois steel was not chemically defective. A late report is that the Navy may adopt the 58,000 lb. standard.

War Department Approves Big Construction Projects

• • • **The War Department** announced April 15:

Authorization for construction of an Army Air Forces installation in Los Angeles County, Cal., to cost in excess of $5 million. Construction incident to this project is being supervised by the Los Angeles district office of the Corps of Engineers.

Acquisition by lease of the Mayflower Laundry, New York, for use by the Army Quartermaster Corps.

Acquisition of a leasehold interest in the Florida Medical Center, Venice, Fla., for use by the Army Air Forces.

Authorization for construction of an Army General Hospital in Santa Clara County, Cal., to cost approximately $3 million. Construction incident to this project is being supervised by the San Francisco district office of the Corps of Engineers.

Award of a contract, in excess of $3 million, to the Mount Vernon Contracting Corp., Mount Vernon, N. Y., for paving and drainage at an Army Air Forces installation in Orange County, N. Y. Construction incident to this project is being supervised by the New York district office of the Corps of Engineers.

Plate Pile-Up May Affect Rolling Schedules; Shipments Suffer Decline

Pittsburgh

• • • **According** to reports reaching here, plate shipments last week from some producing areas were believed to be off as much as approximately 35 per cent. The situation was said to be growing so serious that this week actual plate production, that is, the rolling plates on plate and strip mills, may be reduced at varying percentages ranging as high as 25 per cent, depending on the location of the mill. This would be caused by a backup due to the lack of finishing space and storage space.

As a result of this situation, the WPB this week at Washington is confronted with the greatest problem it has had since the beginning of the war. On the eve of making up new monthly product directives for the various steel companies, WPB has no idea of how far the plate situation will back up the production of ingots and what tonnage of such backup should be redistributed to other steel products until the plate situation is clarified. On top of this is the exceptionally heavy demand for plates which already has suffered a serious setback.

It is believed that at some plants this week the falling off in plate production and shipments will reach such a stage that some mills will be frantically scurrying to find a solution as to what to do with slabs or ingots. Steel companies under CMP and general priority regulations have no control over applying ingots or semi-finished steel to steel products other than as they were originally intended except to a slight amount which approximates 5 per cent of the total steel product directives set by WPB.

The holdup in plate shipments last week and plate production this week is the immediate result of the Truman Committee investigation. This company and other steel companies have not only bent over backwards in pulling tensile tests and making other inspections, but it is believed that Government inspection services, apparently through an order from their superiors, have been told to take more tests than normally. Furthermore, governmental inspectors have refused to OK any shipments until the results of these tests become known. The result of all this has been that plates are stacked all over various steel company yards, slabs were beginning to pile up early this week ahead of the plate mills, and actual ingot production was expected to be adversely affected before the end of this week unless emergency diversions were made by WPB.

Donald Nelson's wire to the steel industry last week that good judgment should be exercised on the plate production situation has boomeranged. The steel companies merely are bending over backward in their own actions so that they will be doubly sure not to face compliance and Department of Justice cases. The longer it takes the WPB and other governmental agencies to unscramble the plate situation, which apparently can only be done by an immediate relaxation in certain specifications and inspection methods of the Government, the more seriously will future war steel production be affected.

WASPS: Women Productioneers — With the WAACS, WAVES, and other alphabetical symbolizations of women in the war effort, Warner & Swasey, Cleveland turret lathe builders, came out with the WASPS. These Warner And Swasey Production Soldierettes are trying their hand at building turret lathes and other machine tool equipment and are doing a swell job.

Photo Courtesy International Business Machines

Modern inspection by optical projection saves time and money

Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

Profit-Producing J&L *Machine Tools*

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

Manufacturers of: Ram and Saddle Type Universal Turret Lathes · Fay Automatic Lathes · Automatic Thread Grinders · Optical Comparators · Automatic Opening Threading Dies and Chasers.

The air line we mean is short—but a mighty important one. It is a life line — that provides safe breathing during gas attacks.

As a component of this line there is a little bent piece of copper tubing—Wolverine Tubing—fashioned into a flat shape to conform to the limited space it must occupy.

Seemingly insignificant, it is called upon to assume much responsibility in safeguarding the lives of our men in service. It is carefully shaped to accurate measurements. In order to better withstand all the elements of the weather and the extremely hard service to which it must be subjected this part is made of copper.

It is only one of the hundreds of different specially-formed items that are daily fabricated here at Wolverine from copper that is now controlled from the ore through every step of processing to the finished product.

CALUMET AND HECLA CONSOLIDATED COPPER COMPANY
WOLVERINE TUBE DIVISION
Seamless Copper — Brass
1441 CENTRAL AVENUE DETROIT, MICHIGAN

Briefly Told—

War Costs $7 Billion In March; Small Plants Recognized by War Dept.

• **Problems arising from** the increasing demand for gears and speed reducers were discussed by the newly formed Gear and Speed Reducer Industry Advisory Committee at its first meeting in Washington with WPB and other government officials. The training of highly skilled machinists and operators for gear cutting machines is one of the most serious problems before the industry.

•

• **A new method of catalytic cracking which might have blast furnace applications was described to the Petroleum Section of the American Chemical Society at its annual convention in Detroit. The broad aspect of the principles developed make possible the anticipation of new industrial methods of handling solids and of controlling temperatures for gases or vapor reactions. Control and simple handling thus represented are expected to be of value in reduction of iron ore and for the roasting and smelting of various ores.**

•

• **Pointing out that a large tonnage of critical alloys can be saved by increased emphasis on tool conservation throughout the metal-working industry, Howard Coonley, director of the WPB Conservation Division, recommended April 19 that each war plant study its tool handling problems and adopt a company-wide tool care policy. Such a policy would largely center around a strong tool handling educational plan in the plant training program for new employees.**

•

• *Sharp reaction against the War Labor Board ruling last week eliminating "inequalities and inequities" as reason for wage adjustments came from the powerful United Automobile Workers Union of the CIO. A meeting of the UAW executive board was called for this week to consider problems said to have been raised by the WLB order. Simultaneously, the General Motors section of the union filed a request with General Motors for negotiations leading to revision of the contract section dealing with wage adjustments.*

•

• **Recent commercial development of magnetite, titaniferous iron bearing ores, zinc, lead and other mineral deposits in New York state is reviewed in a 102-page booklet just issued by the Division of Commerce, Albany, N. Y., under the title, "The Expanding Mineral Industry of the Adirondacks." Dr. H. F. Otte, of Columbia University, is the author.**

•

• **Sal-Way Steel Treating Co.,** Detroit, has established a metallurgical de-

BRIEFLY TOLD

partment within its organization, one of the first steps of the sort taken by a steel treating company. The new department is headed by Sam Ramsey, who comes from the AC Spark Plug Division of General Motors Corp., where he was chief metallurgist of the Browning Machine Gun Division.

•

• **Formation of Algoma Products,** Detroit, for the mass production of "template dies" for the aircraft and similar industries as well as fixtures, has been announced by L. Hoster, general manager of the new company. The company has taken over the former plant of the Weltronic Corp. at 3080 E. Outer Drive, and is also operating a second plant in the Detroit area.

•

• **A number of manufacturers of automatic screw machines have recently brought out revised handbooks for operators of their products. The Cone Automatic Machine Co., Inc., Windsor, Vt., has just published an operator's handbook on its 6-spindle Conomatics. In 112 pages this booklet contains a complete explanation of the construction of these multiple spindle automatics, as well as their operation and the layout of cams. Similar data are contained in a 124-page handbook for operators of Acme-Gridley multiple spindle bar machines, issued by the National Acme Co., Cleveland.**

Brown & Sharpe Mfg. Co., Providence, has available a series of 14 booklets for training operators on Brown & Sharpe automatic screw machines. These booklets cover every type of work that can be performed on single spindle automatics of this design.

•

• *Ferromanganese is among a long list of commodities that will not be exported from the United States to Brazil. The latter country has requested that the metal be included with other commodities which the United States will not authorize for exportation to Brazil.*

•

• **ODT has commended the Duluth,** Missabe & Iron Range Railroad for its cooperation during the Winter in lending a score of locomotives to various Western lines.

•

• **Chairman Donald M. Nelson last Thursday announced the appointment of Bruce Catton as director of information for WPB and the appointment of Charles E. Noyes as associate director. Catton succeeds Stephen E. Fitzgerald, who has accepted appointment as a deputy of the Director of OWI.**

•

• *A section on light metals and alloys has been added to the 1943 edition of the Mechanical World Year Book, published by Emmott & Co., Ltd., 78 Palatine Road, Manchester 20, England. A section on press working has also been largely rewritten and enlarged. Many other subjects are covered in this pocket size manual of 375 pages which sells for 2/6 net (62c.).*

•

• *Announcement of a process for extraction of rhenium from a domestic ore by-product was made at the meeting of the American Chemical Society by A. D. Melaven and J. A. Bacon of the Department of Chemistry of the University of Tennessee.*

Thomas Strip

COLD ROLLED STRIP STEEL

FOR NEW WAR PARTS

ACCURATE TO YOUR SPECIFICATIONS

The Thomas Steel Company has had many years of broad experience in producing cold rolled strip steel to exacting specifications. Especially during the past years of war production, Thomas engineers have added many new and proven facts to their data files which may be applied to your most difficult problem. Therefore, when you are planning a new product, you will find it well worth-while to submit your specifications or samples to The Thomas Steel Company. Have Thomas engineers double check your specifications and prove your die tryout with specially prepared samples. You may also be able to obtain higher production with savings in material by using Thomastrip in bright uncoated or electro-coated finishes.

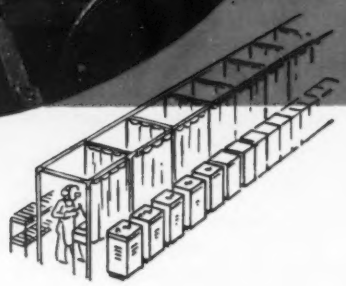
A new, easy to read and easy to use Thomas Steel Book . . . it contains pricing data and general information on rolled strip steel in low carbon, high carbon, and flat wire, as well as on Thomastrip with electro-coated finishes. It's ideal for buyers and engineers.

THE THOMAS STEEL CO. • WARREN, OHIO

WANTED!

200 WELDING OPERATORS IN 10 DAYS

TANK TREAD SHOES, are now welded on assembly lines by women using Westinghouse a-c welders. Treads are positioned in jigs by helpers and swung into welding booths where 34 inches of downhand welding are applied to each.



"We found the answer in untrained women ... and A-C WELDERS," *says Chief Electrician of Large War Plant*

"Production-line welding in 10 days by women operators who never struck an arc before? A few days ago we would have thought it impossible. *Today, it's a fact!*"

So states this official, who has supervised the training of more than 600 women welders, for producing tank tread shoes on seven continuous production assembly lines. The average woman worker quickly learns how to strike an arc and run short beads—from then on she practices, practices, practices welding tank tread shoes. Usually in ten days she is ready for actual production welding (work must pass bend tests)—where her initial work is carefully supervised by her instructor.

"One of the biggest factors that has made it possible—and successful," says this electrical engineer, "has been the use of a-c welders. We bought them originally because they were immediately available, although we had always used d-c.

"We found, however, that the freedom from arc blow made it much easier to develop qualified operators. Weld quality is excellent. Most important, we've had literally no maintenance in nearly a year of 24-hour-a-day average operation."

★ ★ ★

The 275 Westinghouse a-c 500-ampere welders in operation at this plant are just a few of the many Westinghouse welders that are solving problems of availability, ease of operation and freedom from maintenance for many war plants. Ask for booklet B-3136. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

J-21269

Westinghouse A-C WELDERS

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

Prior to the development of this process all rhenium sold in the United States was imported from Germany.

•

• *Production executives from war industries throughout the country will meet in Cleveland on May 5 and 6 to discuss better methods of increasing production at a meeting sponsored by the Production Division of the American Management Association.*

•

• • • **National Aircraft Standard** 205 is now available covering 100 deg. flush head, Phillips recess screws made of aluminum, bronze and alloy steel. This standard is printed on vellum for reproduction in a blueprinting machine and can be obtained from the National Aircraft Standards Committee, c/o Aeronautical Chamber of Commerce of America, 610 Shoreham Building, Washington.

•

• • • *Recognition from Australia and New Zealand has recently been received for the Disston Conservation Control Plan, which was created for the purpose of instructing workmen in the correct selection, use and care of tools to assure faster production and longer tool life. Big orders for the control cards have been received by Henry Disston & Sons, Inc., from concerns in Sydney, Australia, and Aukland, New Zealand.*

•

• **An eight-page bulletin,** No. A112, has just been published by the Bristol Co., Waterbury, Conn., describing a line of new convertible, free-vane, air-operated controllers recently developed.

•

• **C. D. Howe, Canadian minister of** munitions and supply, replying to questions in the House of Commons stated that "Urgency in the output of ships, aircraft and radio devices and certain lines of technical equipment was never so great." His statement was made in clarification of long existing reports that munitions workers were being laid off in Canadian plants and tempo of production had been decreased in plants across the Dominion.

•

• **A new manual detailing how** to get maximum service from portable electric tools has just been published by the Independent Pneumatic Tool Co., manufacturers of Thor electric tools, 600 W. Jackson Boulevard, Chicago. This 20-page, pocket size booklet, is No. JE-199.

•

• **War expenditures by the United States Government reached a new high of $7,112,000,000 in the month of March. This was $1,031,000,000, or 17 per cent, higher than in February.**

•

• **WPB is doing** its utmost to locate every idle electric motor and generator and get it back into active service, according to John Gammell, Chief of WPB's Electrical Equipment Branch, in a statement calling upon industry to cooperate with the division by listing idle motors and making full use of its services in obtaining second-hand equipment.

•

• • • **Bantam Bearings Corp., South Bend, Indiana, a subsidiary of the Torrington Co. of Torrington, Conn., for eight years, has been merged with its parent company and will henceforth be known as the Torrington Co., Bantam Bearings Division. The Bantam Division will retain its present personnel and continue its operations from the South Bend headquarters.**

•

• *An all-time production record has been established by the Elastic Stop Nut Corp. of America, the nation's largest self-locking nut manufacturer, it was announced recently, with*

PRAISE FOR PRODUCTION: William T. Hedlund, president of the Elastic Stop Nut Corp., congratulates his top manufacturing executives on the all-time production record set by the Linden plant of the company.

For
PRODUCTION
A-C WELDING

Whether it's a problem of training new operators quickly or of improving present weld quality, Westinghouse a-c welders, with their freedom from arc blow, can help you. 100, 200, 300 and 500-ampere models. Also 1000-ampere models for use with the Unionmelt process.

NEW
D-C WELDER with
ARCONTROL

Single, pre-set current adjustment. Lots of capacity to handle all kinds of work. No drop-off after warming up—less lost motion making adjustments. 200, 300, 400 amperes.

MULTIPLE-OPERATOR SETS

Do the work of 20 to 30 single-operator rotating sets. Stationary types for shop operation—semiportable types for use on shipways and similar applications. Ask for complete data.

PORTABLE
TACKING
PANELS

Compact, single-operator control panels for fit-up work with multiple-operator sets. Extra capacity for light tack welding.

Write for latest literature. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
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Westinghouse
PLANTS IN 25 CITIES... OFFICES EVERYWHERE
WELDERS

How a BAKER CRANE TRUCK solved a tough problem for Bailey Meter Co.

PROBLEM: To obtain greatly increased production without external plant expansion.
Baker
SOLUTION: Utilization of overhead space by constructing mezzanine floors, and substituting Baker Truck for traveling craneways removed. Truck also saves time and space at other points throughout plant.

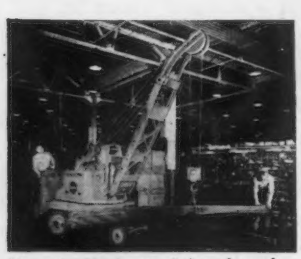
Bailey products range from small instruments weighing less than 10 lbs. to complete control panels weighing more than a ton. In their manufacture, a wide variety of castings, bar stock and other materials require handling—from incoming carriers, in plant and warehouse, and to shipping. Besides substituting for removed overhead cranes, truck is used to relieve congestion on others, to handle material beyond their limits, to assist in the erection of control panels, to tier material for conserving space in storage, and for a wide variety of operations which were not anticipated when truck was purchased. Thus the company was enabled to attain increased production without increasing plant size.

In erection of control panels, Baker releases overhead cranes for other work.

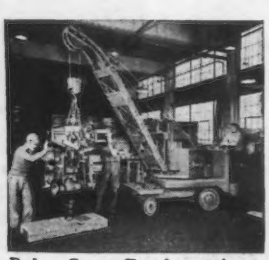
Small parts in standard boxes are tiered by Baker Truck to conserve space.

A Baker Material Handling Engineer may solve similar problems for you. Check with him now for current or post-war needs, or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2175 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.



Transferring bar stock from incoming cars to storage with Baker Crane Truck.



Baker Crane Truck spotting a large valve in position for crating.

Handling panels boxed for shipment—an awkward job made easy by Baker Truck.

1608-1A-43

Baker INDUSTRIAL TRUCKS

BRIEFLY TOLD

the previous daily production record topped by more than 1,000,000 nuts.

•

• **Brief vacations for war workers** have been advised by Donald M. Nelson, chairman of WPB. Believing that physical and mental rest would give the worker renewed energies, Nelson suggested carrying out the program without loss of production by staggering vacation schedules, training substitutes and, if necessary, working additional overtime.

•

• **Declaration that the post-war** world must act in concert to conserve scarce metals was made before an April A.I.M.E. meeting in Detroit by Dr. Zay Jeffries, chairman of Carboloy Co.

Adam MacKenzie, of Carboloy Co., was elected chairman of the Detroit A.I.M.E. section for the following year. Other officers elected include: Vice-chairman E. O. Kirkendall, Wayne University; secretary, D. Z. Dailey, Champion Spark Plug Co.; treasurer, E. R. Darby, Federal Mogul Corp.; and executive board, B. B. Beckwith, Vanadium Corp., J. Hanawalt, Dow Chemical Co., G. Timmons, Climax Molybdenum Corp., G. Ewald, Revere Copper & Brass Co., and O. Lindquist, consulting metallurgist.

•

• *The annual meeting of the Electric Metal Makers Guild, Inc., will be held in Canton, Ohio, on June 4 and 5. There will be joint and separate meetings of the castings and ingot divisions on both days, and the annual banquet on the evening of June 5 will close the sessions.*

•

• **Robert R. Nathan**, chairman of the WPB Planning Committee, pointed out in a speech in New York before the Sales Executives' Club that it was only through planning that the free enterprise system of the United States is producing a volume of war goods equal to the rest of the world. He also feels that only by similar planning can the free enterprise system effect a successful transition to peacetime production during the post-war period.

•

• **American industries will** produce not only all the weapons required by our armed forces, but a surplus big enough to meet any deficiencies of our allies, said Homer D. Sayre, commissioner of the National Metal Trades Association, in an address before the annual meeting of the Association's Central New York branch.

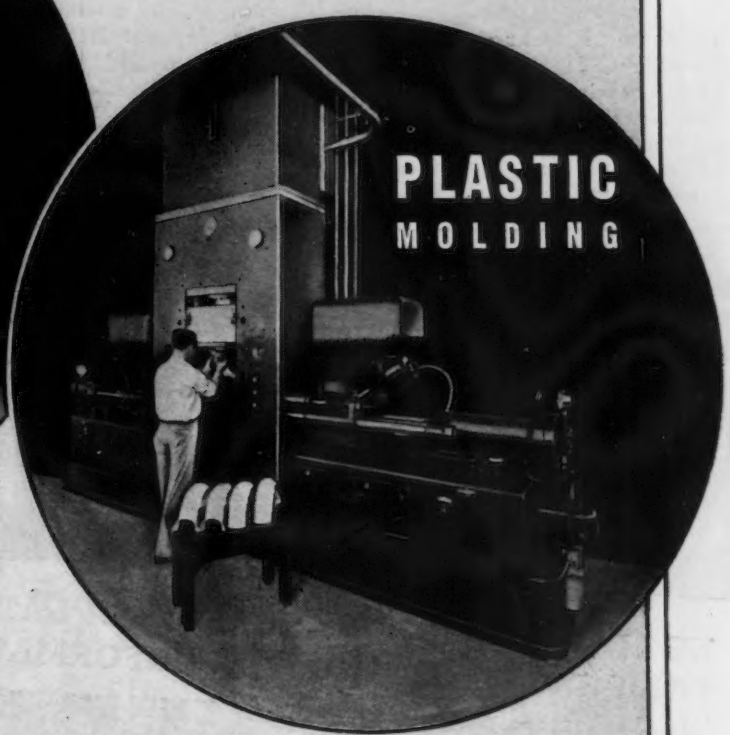
•

• **The development of a plastics and wire screening material to reduce wartime danger from flying glass promises to add new flexibility to post-war offices is reported by the plastics division of the Monsanto Chemical Co. in cooperation with the Navy.**

•

• **At the request of the** Automotive Council for War Production, the American Standards Association has

METAL SPECIALTY



Fulfilling exacting requirements for leading industries everywhere in

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•

DRAWING · COINING · STAMPING
ROLLING · FORMING · WELDING

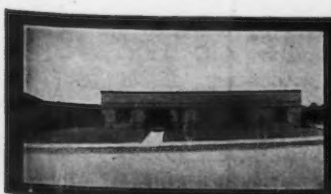
Metal Specialty's plants are equipped to render you complete service in the fabrication of all metal parts, and in plastic injection molding up through 18 ounces per shot. Along with 850-ton self-contained hydraulic presses for metal working, Metal Specialty has one of the four 18-36-ounce capacity injection presses for custom molding together with full complementary equipment.

ASSEMBLED JOBS

PRESSED METAL TO ORDER

THE PLANT AT CINCINNATI, OHIO

THE PLANT AT RICHMOND, IND.



The
METAL SPECIALTY Co.
MAIN OFFICE AND PLANT • ESTE AVENUE • CINCINNATI, OHIO

initiated the revision of the Tentative American Standard Tolerances, Allowances and Gages for Metal Fits (B4a-1925) and the addition of gage specifications to such a revised standard.

•

• Arthur E. Schnell, general superintendent of Aluminum Industries, Inc., Cincinnati, has been honored with a U. S. Army Citation for important savings in vital war material. This is the first distinguished service citation to be awarded to a war production worker in the Cincinnati Ordnance District.

•

• *"Production Keys to Victory" will be the theme of the 45th annual convention and production conference of the National Metal Trades Association to be held in Chicago, May 26 and 27. Sessions scheduled for the meeting will cover production problems, industrial relations, training programs for personnel, new developments and techniques, and government legislation and its relation and importance to the metal trades industry.*

•

• Accepting an Army-Navy "E", vice-president Philip S. Savage, of the Donner-Hanna Coke Corp., Buffalo, disclosed that construction has started on more than a dozen new coke ovens to cost about $350,000. He said the ovens are scheduled for completion by Nov. 1.

•

• • • Scranton, Pa., free from manpower and housing problems as outlined in a recent item in THE IRON AGE, has been selected as the site for a new plant for the Murray Corp. of America, Detroit.

•

• • • T. C. Charles Mayberry, general superintendent of the Great Lakes Steel Corp., was elected chairman of the Detroit Section of the Association of Iron and Steel Engineers for the ensuing year. Other officers chosen were: vice-chairman, H. E. Phelps, electric furnace superintendent, Rotary Electric Steel Co.; executive committee, E. M. Harold, Michigan Steel Co., div. of Great Lakes Steel, and L. M. Ripple, of Great Lakes Steel.

•

• A portfolio of 40 large classroom charts on "Dimensional Control-Theory and Industrial Application" is available from the Sheffield Corp., Dayton, Ohio, at a price of $3.50. The charts are 27 x 32 in. with heavy covers which act as a supporting easel. Also included is the outline of a talk to be given with the charts presenting an overall picture of gaging practice.

•

• To insure the most effective possible use of industrial diamonds in war industries and to determine how their useful life may be prolonged is the twofold purpose of a scientific investigation initiated by the Office of Production and Research of WPB. The War Metallurgy Committee of the National Academy of Sciences cooperating with the Diamond Section of WPB has accepted the task of directing the investigation, which includes a series of laboratory, tests that are now in progress.

COMING EVENTS

April 28 to 30—American Foundrymen's Association, St. Louis.

April 29 to 30—American Institute of Mining and Metallurgical Engineers, Cleveland.

May 10 to 12—Mill Supply Convention, Cincinnati.

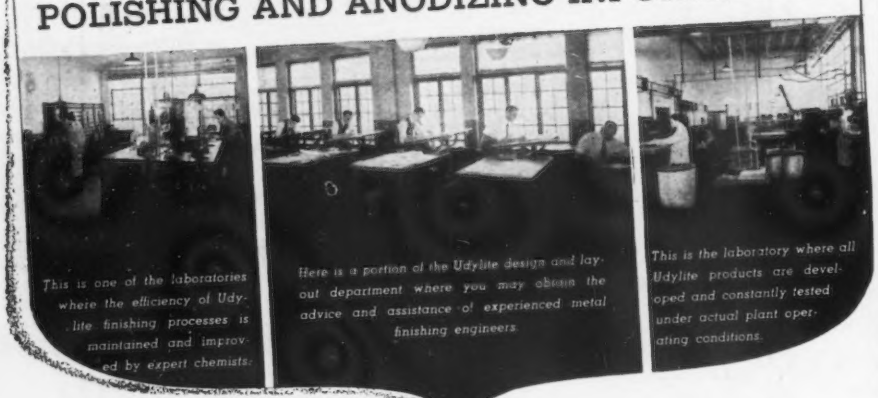
May 17 to 18—National Association of Sheet Metal Distributors, Cleveland.

May 17 to 19—American Gear Manufacturers Association, Rye, N. Y.

June 9 to 10—SAE War Material meeting, Detroit.

UDYLITE

HEADQUARTERS FOR ELECTROPLATING, POLISHING AND ANODIZING INFORMATION



This is one of the laboratories where the efficiency of Udylite finishing processes is maintained and improved by expert chemists.

Here is a portion of the Udylite design and layout department where you may obtain the advice and assistance of experienced metal finishing engineers.

This is the laboratory where all Udylite products are developed and constantly tested under actual plant operating conditions.

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For prompt, dependable metal finishing information, call on Udylite. No organization is better equipped to give you information gained from installing plating, polishing and anodizing departments in many leading manufacturing plants throughout the country. ● **Trained plating engineers and electrochemists are** at your service. These men *know* metal finishing and they can help you plan a new installation or revise your present one for greater efficiency. They know, also, that you want information quickly. ● **Udylite has a complete line of equipment . . .** second to none in terms of quality and efficient performance. ● **and supplies . . .** for every metal finishing need. Salts, acids, anodes, buffing and polishing materials—everything required. ● Call Udylite for prompt service on your finishing requirements. You pay no more for Udylite dependability.

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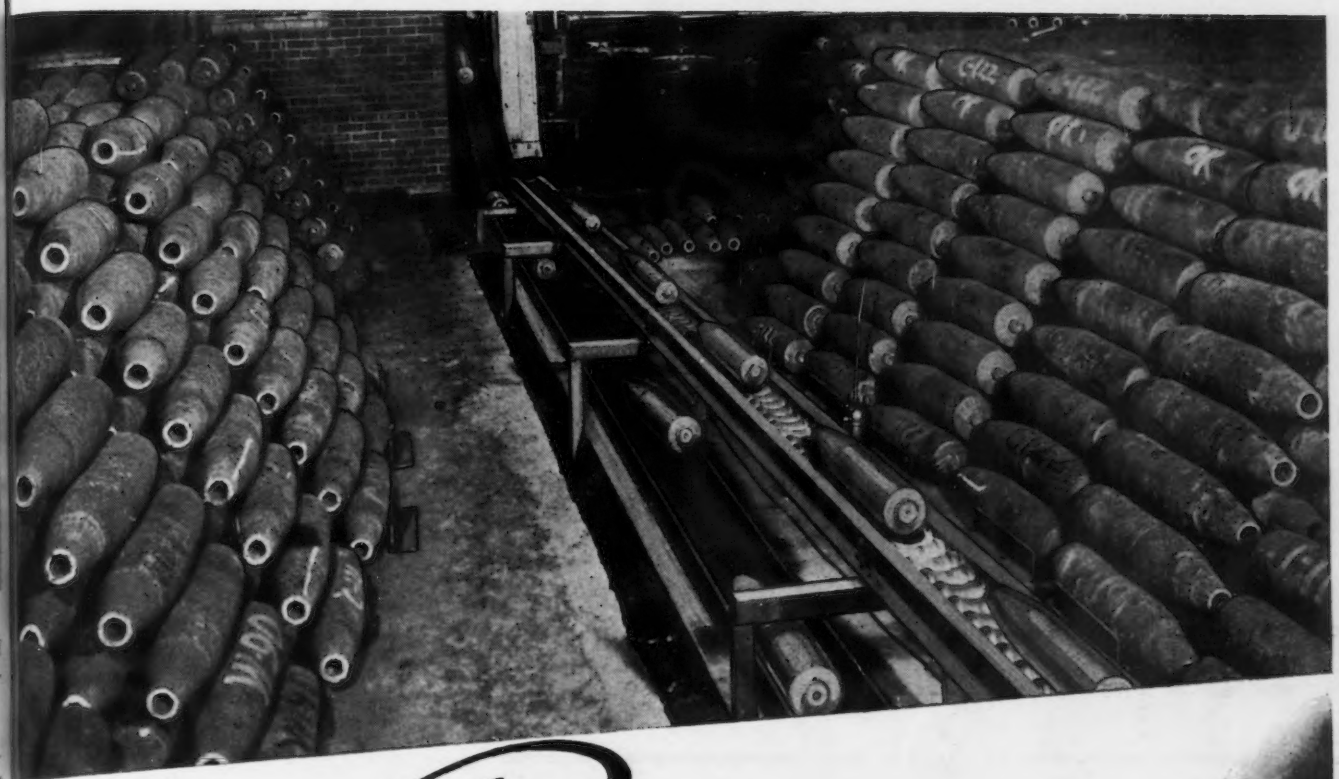

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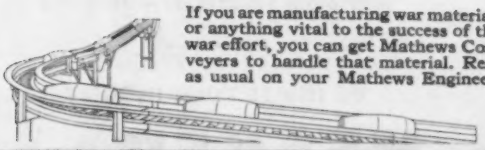
PASSING AMMUNITION FASTER through production stages . . . speeding it into the hands of America's fighting forces . . . that's a Mathews Conveyer job!

In your plant, if there is any lag in moving materials to and from men or machines, perhaps a Mathews engineer could point the way to improving this condition.

Mathews Conveyers are available for critical war materials . . . there is no surer way to shorten the war than to speed Victory at its source!



If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

MATHEWS CONVEYER COMPANY ELLWOOD CITY PENNSYLVANIA

Higher Manhours Per Unit a Worry

• • • **A much larger number** of manhours per unit of raw material is entering into the manufacture of durable goods in wartime than in peacetime, due to the greater degree of fabrication required to produce war goods, according to Department of Commerce. This is shown by the number of manhours required to fabricate raw steel into iron and steel products and carries implications for the post-war period.

Major processors of steel last year utilized on the average 133 manhours to fabricate a ton of steel into guns, tanks, machine tools and other steel products. This represents an increase of almost 60 per cent over the 85 manhours required per ton of steel fabricated in 1939.

Labor efficiency probably has declined because of an influx of untrained workers, while time is required for management to develop the most efficient methods of producing a new product, the department said.

From 1929 to 1940 progressively fewer manhours were used in fabricating the same tonnage of steel. In 1940, even though the amount of steel consumed was 5 million tons greater than in 1929, the number of manhours for these industries was more than 20 per cent less.

In the last quarter of 1942, based on the trend of productivity in the 1929-40 period, the manhour requirements corresponding to the annual rate of steel produced in that quarter would have been 7.6 billion manhours (annual rate). Actually the number of manhours for these industries amounted to an annual rate of 13.2 billion manhours in the final quarter of last year, or 75 per cent greater than the number that would have been required on the basis of past performance.

Discussing the post-war era, the department said:

"In view of the wide destruction caused by global war, if world demand should require the metal processing industries to continue to utilize in fabricating end products all the productive resources employed at the peak of the war effort they would need more raw materials than the iron and steel industry could supply with its expected capacity of 97,000,000 tons capacity as of December, 1943. In fact, even if the metal processing industries should generally observe the 40-hour week in the post-war period, further expansion of iron and steel capacity would be required.

"The second alternative would be to shrink the metal fabricating industries down to a level where they would consume no more raw materials than the iron and steel industry could supply with its 97,000,000 tons of capacity. Because of the smaller number of manhours needed to fabricate peacetime products, this would mean—in addition to a shorter work week—a substantial diversion of manpower to other fields of activity."

Alien Employment Urged

• • • Paul V. McNutt, chairman of WMC called attention last week to the large number of registered aliens not yet being used effectively in labor shortage areas. It should be understood, he explained, that the alien questionnaire form needs to be completed and filed only when an alien is to be employed on a job in connection with a "classified" or aeronautical contract. A large amount of war production is not of the classified or aeronautical type, and when it is not, an alien may be hired and put on the job as simply as an American citizen.

(A classified contract is one stamped "secret," or "confidential," or "restricted.")

ECONOMIZE ON ZINC

with

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PROCESS

for Electro-Galvanizing Wire

Even the lightest coatings are uniformly distributed on the wire surface. Control of coating thickness is exact. You can save on zinc, produce more perfect coatings, make more profit with Meaker Process for Electro-Galvanizing Wire.

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We've put our
House in Order
Our investment in P&H Electric Cranes has done two things for us:
First: it has provided a swift, uninterrupted flow of materials for today's peak production.
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OVERHEAD CRANES

CIO Loss of Face Seen in Strike

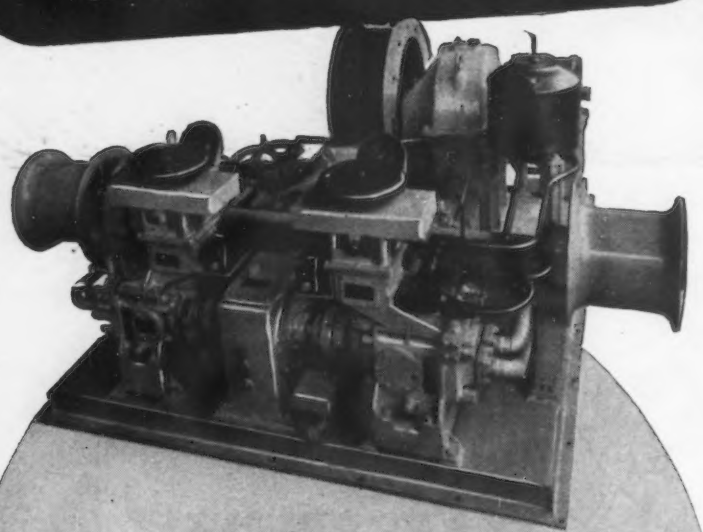
Cleveland

• • • **Organized labor** suffered one of the most severe "losses of face" since the inception of the CIO last week as a result of the complete failure of an announced "authorized" strike at the Thompson Products Co., Cleveland. The strike, called 9:45 p.m. Tuesday, ended at 4:30 p.m. Wednesday when strikers unanimously elected to return to work on the 7:00 a.m. shift Wednesday. This was believed to be the first strike labeled "authorized" since Pearl Harbor, but some confusion has arisen as to whether or not CIO-UAW headquarters in Detroit approved the strike so that it could be classed as authorized.

Ed Hall, CIO organizer, called the strike in protest to the dismissal of 12 employees of the plant. Eleven of the 12 employees fired are committeemen of the UAW and were allegedly discharged as a result of their intercession in behalf of the twelfth who was discharged, the company said, for falsifying production reports. Hall had asked the regional WLB to have the 12 reinstated pending investigation of the merits of the discharge, and when the request was denied the strike was called.

The company tagged the strike a "dismal failure," stating that less than 350 of the 4800 plant employees went out.

made to "order"



These electro-hydraulic winches are typical of the special hoisting machinery developed and manufactured by BAYARD. They represent just one instance of the many types of naval equipment designed, engineered and furnished by this company to individual specifications.

BAYARD

The coveted Navy "E" Pennant—awarded to Bayard for excellence in fulfilling Naval contracts.

M. L. BAYARD & CO., Inc. • ENGINEERS • MACHINISTS • PHILADELPHIA

DPC Issue Contracts For Variety of Projects

Washington

• • • **Defense Plant Corp.**, RFC subsidiary, has authorized the following contracts:

Wenatchee Alloys, Inc., Canton, Ohio, to provide additional facilities at a plant in Washington at a cost in excess of $200,000, making a total commitment of more than $1,450,000.

Grain Processing Corp., Muscatine, Iowa, to provide additional plant facilities at a plant in Iowa at a cost in excess of $380,000, making a total commitment of more than $1,225,000.

Barnes-Duluth Shipbuilding Co., Duluth, to provide additional plant facilities in Minnesota at a cost in excess of $300,000, making a total commitment of more than $900,000.

Westvaco Chlorine Products Co., New York, to provide additional plant facilities in California at a cost in excess of $100,000, making a total commitment of more than $340,000.

Pacific Intermountain Express, Salt Lake City, to provide transportation equipment to be operated in various Western states at a cost in excess of $155,000.

Ralph C. Coxhead Corp., New York, to provide machinery and equipment for a plant in New York.

Ford Motor Co., Dearborn, Mich., to provide additional plant facilities in Michigan, Missouri, Tennessee, Ohio and New York at a cost in excess of $34,000,000, making total commitment of more than $68,000,000.

Jacobs Aircraft Engine Co., Pottstown, Pa., to provide additional facilities at a plant in Pennsylvania at a cost in excess of $350,000, making a total commitment of more than $21,000,000.

Curtiss-Wright Corp., Caldwell, N. J., to provide additional plant facilities in New Jersey at a cost in excess of $1,050,000, making a total commitment of more than $7,800,000.

Buffalo Brake Beam Co., New York, to provide plant facilities in New York at a cost in excess of $875,000.

Lear Avia, Inc., Piqua, Ohio, to provide additional equipment for a plant in Ohio at a cost in excess of $200,000, making a total commitment of more than $850,000.

Prest-O-Lite Co., Inc., New York, to provide equipment to be used in distribution of its products at a cost in excess of $800,000.

American Distilling Co., Inc., New York, to provide additional plant facilities in Illinois at a cost in excess of $125,000, making a total commitment of more than $750,000.

Hydraulic Equipment Co., Cleveland, to provide equipment for a plant in Ohio at a cost in excess of $85,000.

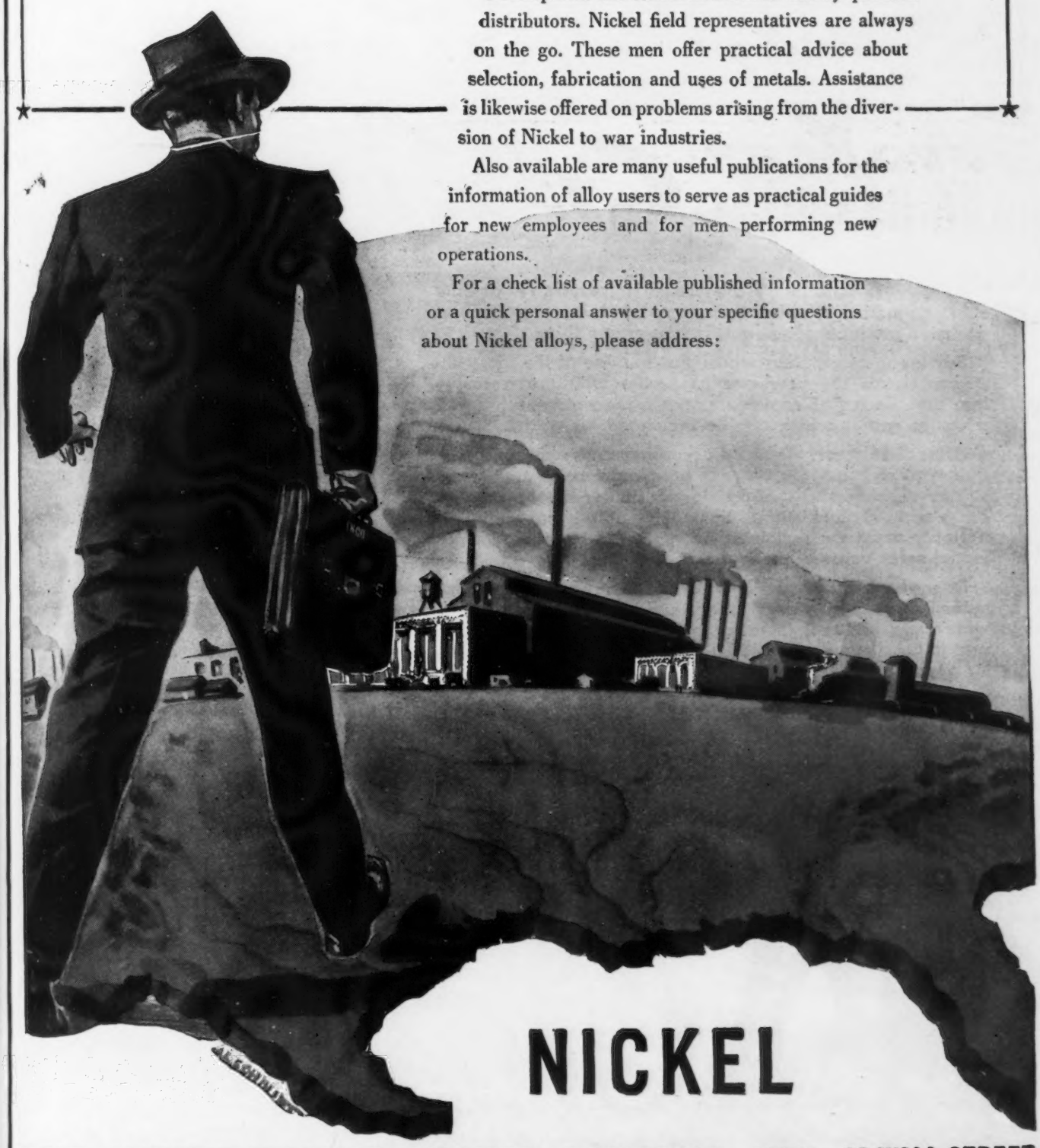
National Industries, Inc., Fort Wayne, Ind., to provide additional equipment for a plant in Indiana at a cost in excess of $85,000.

ON THE MARCH to aid users of alloys...

FIELD offices are maintained by International Nickel's Development and Research Division and by qualified distributors. Nickel field representatives are always on the go. These men offer practical advice about selection, fabrication and uses of metals. Assistance is likewise offered on problems arising from the diversion of Nickel to war industries.

Also available are many useful publications for the information of alloy users to serve as practical guides for new employees and for men performing new operations.

For a check list of available published information or a quick personal answer to your specific questions about Nickel alloys, please address:



NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

Serious Charcoal Shortages Force Shut-Downs

New York

• • • **The shortage of charcoal** has become so serious that the charcoal blast furnace of the Newberry Lumber & Chemical Co. has been forced to shut down since there was enough wood for only six days. The furnace cannot start up again until more wood is gathered. Usually, the company has a wood supply sufficient for six months. Another furnace that has been forced to cease operation because of a dearth of wood for charcoal is that owned by the Delta Chemical & Iron Co., Wells, Mich. This furnace probably never will go back into operation as all the wood within 50 miles of the plant has been cut. In some instances the plant has been forced to move wood 100 miles by rail.

Tubing Hauled Far Just to Be Cleaned

• • • It's hard to convince certain officials of a Pittsburgh steel company that the demand for steel on the West Coast is as critical as reported. Here's why: The company recently received back several hundred tons of its boiler tubes, rejected by a government inspector on the grounds that too much dirt had been collected by the tubing while it was in transit in open railroad cars. Without much trouble the tubing could have been cleaned on the Coast, the steel company asserts.

Save Your GRINDING WHEEL Stubs!

Abrasive grains today are critical materials. A definite shortage is in sight unless every user of abrasive grains and abrasive products cooperates in conserving them.

Salvaging of grinding wheel stubs is one of the most important ways the user can cooperate with the abrasive industry. Each stub contains a certain percentage of unused abrasive grains which can be reclaimed.

Users should sort the stubs according to the kind of grain and type of bond. Do not mix aluminum oxide stubs with silicon carbide stubs. And do not mix resinoid bonded stubs with vitrified stubs. By making this separation you not only assist the reclaimer but you also increase the potential sales value of the stubs.

After you have accumulated a sufficient quantity of these stubs, get in touch with your supplier. He will tell you where you can sell them for reclaiming. Let's all do our part to keep every possible bit of abrasive material working for Victory.

GENERAL ABRASIVE CO., INC.

Manufacturers of

LIONITE and CARBONITE Abrasive Grains

Niagara Falls, N. Y., U.S.A.

Although charcoal pig iron accounts for only a minute proportion of all pig iron produced in this country, about 101,000 net tons for 1943 compared with a total tonnage of over 59 million tons, the consumers of this type of pig iron which are found mainly among roll makers, machine tool builders and makers of chemical castings, have become extremely worried at the depletion of their stocks. One foundry has written its supplier that it has not yet found a substitute for the charcoal iron and is in dire need for the material in order for its product to meet a rigid electrical specification. A large producer of chilled iron rolls claims that it must have charcoal iron to keep down the manganese and silicon content of the charge. If they are too high, it becomes necessary to do a large amount of oxidizing in the furnace operations which results in a serious lowering of the carbon and in a highly oxidized metal. "In cupola mixtures, charcoal iron is a great scrap carrier and when eliminated will force the use of higher percentage of coke iron, in order to produce a casting with the same machinability," says an Eastern machine tool builder.

At a meeting of the WPB in the middle of March, it became evident that the consumption of charcoal was far greater than the supply, about 2.5 to 1, and every effort was made to keep the woodchoppers on the job. But the problem is greater than only of labor since the wood sources of many of these plants have been depleted for many miles. With the present rail situation, the best solution would move the mountain of Mahomet, especially when the mountain has both iron ore and hard wood.

THAT EXTRA "SOMETHING"

IT takes more than manufacturing ability to make the highly specialized products used today to process metals.

It requires more than a knowledge of oils themselves to make modern lubricants . . . and more than tanning experience to mould leather packings for today's hydraulic needs.

What is that extra "something?"

Let's call it RESEARCH—a mis-used word sometimes, but the only term broad enough in its scope to explain our meaning. Research includes the beaker, the bunsen burner, the notebook . . . the endless days of experimenting to do better than had been done . . . the long plant investigations to be sure laboratory findings prove true.

A packed briefcase in the hands of a Houghton Research Staffman called in by plant executives—that's the "end use" of Research. Its beginning may have been during World War I, when we learned lessons still applicable today. Recent developments which make possible the speedy mass production of armament and munitions often can be traced back to research work of a decade or more ago.

From the beginning made in our "labs," five Houghton plants follow through on a production basis. In the nation's key cities are Houghton technical specialists in metal working, heat treating, lubrication, textile processing, transmission belting and mechanical packings. It is their job to back up the efforts of more than one hundred Houghton men the country over.

For example, shell manufacturers sought a quenching oil that would properly harden shells made from "lean alloy" steel. Houghton ships it—in tank-car lots.

Plane builders want leather packings which will withstand all pressures and temperatures, even down to minus 60° F. We supply them . . . and fast.

Gun makers demand a cutting oil that will enable them to drill barrels accurately and fast . . . a tough job, for which Houghton supplies tough oils.

Tank manufacturers call for carburizers that will case-harden plate . . . again Houghton carloads.

And so it continues as war production constantly brings new problems. E. F. Houghton & Co. is justly proud of its Research Staff. We want you to use its facilities, its knowledge. Therefore we repeat the offer made to industry before war came to America:

That at any time, in any way, you feel our experience will help you—whether or not a Houghton product is involved—the full facilities of our Research Staff are at your service.

We have the technical specialists—you have the technical problems. Let's continue to bring them together, and in that way help bring Victory closer.

ARE YOU . . . Heat treating steel? ~ Rust-proofing metals? ~ Machining gun barrels or parts? ~ Casting magnesium or aluminum? ~ Cleaning aluminum? Lubricating 24-hour plants? ~ Processing textiles? Quenching NE steels? ~ Servicing hydraulic equipment?

Houghton Research experience includes all these—and more. Use it!

E. F. HOUGHTON & CO.

CHICAGO PHILADELPHIA SAN FRANCISCO DETROIT

78 Years of Pioneering Research

New Class B List Establishes End-Use Symbols

• • • **A new set of Class B product symbols has been assigned to items falling within the jurisdiction of the various Industry Divisions of WPB to replace the former S-3 designation which was used for B products during the second quarter. The new symbols will not be applicable until the third and subsequent quarters.**

The purpose of applying the new symbols to B products is to provide WPB with a means of determining at mill levels, the uses to which controlled materials will be put. Each symbol indicates a B product program. The plan for using the new B products symbol calls for continued use of the S-1 symbol applying to repair parts. The new B product designations completely replace the use of the former S-3 symbol.

Official B product program identification symbols follow:

Automotive Division

B-1 Auto accessories and replacement parts.
B-2 Internal combustion engines (automotive).
B-3 Sleeve bearings, journal bearings and bushings.
B-4 Storage batteries (aircraft).
B-4 Brakes, automotive, air and hydraulic.
B-4 Wheel assemblies, automotive.
B-4 Carburetors (exc. aircraft).
B-4 Automotive repair shop special machinery and equipment.
B-4 Spark plugs (except aircraft).
B-4 Storage batteries (except aircraft).

Building Materials Division

B-5 Bolts, nuts, screws, rivets (exc. aluminum rivets) (aircraft).
B-5 Bolts, nuts, rivets (exc. aluminum), washers, screws, and pins.
B-6 Service entrance switches and multibreakers for housing and industrial lighting circuits.
B-6 Electric conduit and conduit fittings.
B-6 Electric connectors.
B-6 Fuses, under 2300 volts.
B-6 Wiring devices and supplies, electric.
B-7 Infra-red heating and drying equipment.
B-7 Lighting fixtures.
B-7 Floodlights and searchlights.
B-7 Fluorescent lighting fixtures (commercial and industrial), and cold cathode lighting systems.
B-7 Incandescent lighting fixtures: Industrial, infra-red, mercury lamp (commercial and residential).
B-7 Marine lighting equipment and accessories.
B-7 Special blackout and dimout lighting fixtures.
B-7 Street and highway lighting fixtures and traffic control signals and controllers.
B-7 Tools, edge.
B-7 Tools, hand (exc. mechanics' hand service tools).
B-7 Building mesh, metal.
B-7 Doors and windows, metal.
B-7 Fabricated structural metal building products.
B-7 Plastering bases and plastering accessories, metal.
B-7 Screen cloth, insect (metal).
B-7 Sheet metal building products.
B-7 Hardware, builders'.
B-7 Hardware, transportation equipment.
B-7 Hardware (exc. builders' and transportation equipment); saddle and luggage hardware, furniture and refrigerator hardware, mail receivers and boxes.
B-7 Non-metallic mineral building products.

Construction Machinery Division

B-8 Power cranes and shovels, draglines, buckets, stiff-leg derricks, and dredges.
B-8 Winches and hoists, contractors' elevating.
B-8 Drilling and boring machinery, earth and rock (exc. well drilling).
B-8 Drilling machinery, water well.
B-9 Construction equipment, tractor mounted.
B-9 Track-laying tractors.
G-1 Construction machinery, specialized.
G-1 Construction material mixers, spreaders, pavers, surfacers, finishers, tampers, vibrators, and related construction machines.
G-1 Construction material processing equipment.
G-1 Scrapers, maintainers and graders.

Consumers Durable Goods Division

G-2 Clocks (aircraft).
G-2 Watches (aircraft).
G-2 Camera accessories (aircraft).
G-2 Plates, name (aircraft).
G-2 Bicycles.
G-2 Power cycles (exc. motorcycles).
G-2 Lamp bulbs and tubes, electric.
G-2 Cooking and heating appliances, commercial (electric).
G-2 Cooking and heating appliances, domestic (electric).
G-2 Electrical appliances, commercial (exc. heating and cooking).
G-2 Electrical appliances, domestic (exc. heating and cooking).
G-2 Dry cell batteries.
G-2 Tubes, electronic (exc. radio and radar, rectifier, X-ray, and physiotherapy tubes).
G-2 Tubes, rectifier (tungar, rectigon, and similar tubes).
G-2 Lawn mowers, hand and power.
G-2 Refrigerators, ice (domestic).
G-2 Flashlight cases and portable electric lanterns, incandescent.
G-2 Lamps, liquid fuel.
G-2 Lamps, portable electric (incandescent) (exc. industrial bench machine, and physiotherapy).
G-2 Lanterns, electric, incandescent (exc. portable electric lanterns).
G-2 Bedsprings.
G-2 Bunks and berths, metal.
G-2 Furniture, wooden.
G-2 Hospital beds, metal.
G-2 Photographic equipment and accessories.
G-2 Food preparation and serving fixtures, equipment and appliances, commercial (exc. cooking).

GROOMING BIG NAVY GUNS: Barrels for 16-in. Navy rifles are shown being processed in a Navy factory. With packed bits, the big gun boring lathes are cutting away the remaining surplus of steel.

G-2 Cutlery.
G-2 Razors (exc. electric).
G-2 Razor blades.
G-2 Jewelry.
G-2 Silverware, plated.
G-2 Silverware, sterling.
G-2 Clocks and watches (including chronometers).
G-2 Animal traps and cages.
G-2 Bells and gongs, non-electric.
G-2 Kitchen, household, and other miscellaneous articles as defined by WPB Order L-30 (exc. military and naval types).
G-2 Identification plates, badges, emblems pin-tickets, and tags (exc. military).
G-2 Hairpins, bob pins, and hair curlers.
G-2 Needles, domestic.
G-2 Pins, common and safety.
G-2 Mirrors.
G-2 Morticians' goods.
G-2 Musical instruments.
G-2 Office supplies (including marking devices).
G-2 Pens and pencils.
G-2 Umbrellas and parasols.
G-2 Baby carriages and similar equipment.
G-2 Fishing equipment, commercial.
G-2 Sporting goods (exc. mechanical rubber goods).
G-2 Church goods.

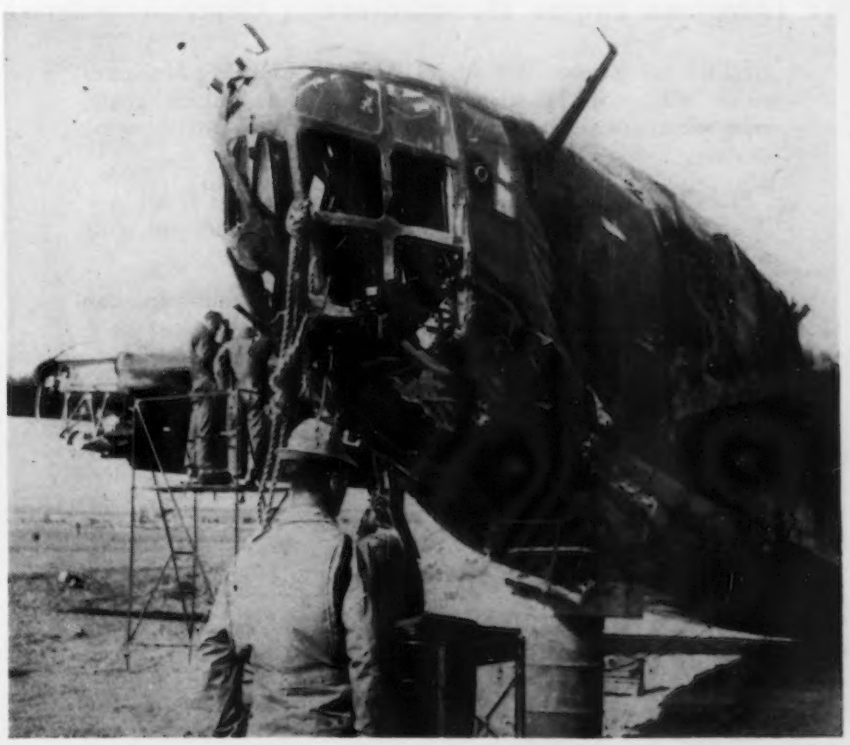
Containers Division

G-3 Cylinders, gas (aircraft).
G-3 Gas cylinders (exc. flasks and containers).
G-4 Drums and barrels, steel (30 gage and heavier).
G-4 Plugs and flanges for steel shipping containers.
G-5 Bags (aircraft).
G-5 Containers, paper-consumer type.
G-5 Shipping containers, corrugated and solid fiberboard, using wire or staples but not strapping (exc. fiber drums).
G-5 Drums, fiber.
G-5 Beverage crowns, metal.
G-5 Crowns, metal (exc. beverage).
G-5 Collapsible tubes, including clips.
G-5 Fluid milk shipping containers.
G-5 Shipping kits and pails, steel.
G-5 Bag tins, metal.
G-5 Baskets and hampers, veneer.
G-5 Boxes and crates, wooden—nailed.
G-5 Boxes and drums, plywood.
G-5 Boxes, wooden, wirebound.
G-5 Cooperage, slack.
G-5 Cooperage, tight.
G-5 Strapping, metal (round and flat), including seals.

General Industrial Equipment

G-6 Motors, electric (aircraft).
G-6 Amplidynes, selsyns, and dynamotors.
G-6 Motors and generators, including motor generator sets, except generators for internal combustion engines, motors made by electric appliance manufacturers for incorporation therein, and motors for elevators and mine locomotives.
G-7 Compressors and dry-vacuum pumps, reciprocating.
G-7 Pumps, industrial.
G-8 Mechanical power transmission equipment, industrial (except speed changers).
G-8 Speed changers.
G-9 Heat exchangers.
J-1 Welding equipment and apparatus, electric.
J-1 Welding equipment and apparatus, non-electric.
J-2 Welding rods and electrodes.
J-3 Electric motor controls and control equipment.
J-3 Air circuit breakers (up to 600 amperes and 600 volts): AB type, ET type.
J-3 Bus ways and bus ducts (up to 600 volts and 4000 amperes).
J-3 Panel boards and distribution boards, electric (industrial).
J-3 Switches, knife and enclosed, rated 30 amperes and above.
J-4 Refrigeration and air-conditioning equipment (exc. domestic refrigerators).
J-5 Switches and circuit breakers, electric (aircraft).
J-5 Conveyors and conveying systems (exc. underground mine conveyors).
J-5 Trucks and tractors, industrial (hand-operated).
J-5 Trucks and tractors, industrial (power-propelled).
J-5 Fans, blowers and exhausters (exc. turbo blowers, soot blowers and domestic propeller type fans) of a portable nature.
J-5 Dust-collecting equipment, industrial.
J-5 Turbo blowers and turbo exhausters.
J-5 Elevators (exc. shipboard elevators, portable elevators to be reported as industrial trucks, mine hoists).
J-5 Spraying equipment, industrial.
J-5 Presses, baling (exc. agricultural).
J-5 Lubricating equipment, industrial.
J-5 Glue pots.
J-5 Bakery machinery (exc. field baking equipment).
J-5 Canning plant machinery.
J-5 Cereal manufacturing machinery.
J-5 Dairy and milk products plant machinery.
J-5 Sugar mill and refinery machinery, cane and beet.
J-5 Fiber drum making machinery.
J-5 Paper bag making machines.
J-5 Paper can and tube making machines.
J-5 Dry kilns and redriers.
J-5 Logging and sawmill machinery and equipment.
J-5 Wooden box making machinery.
J-5 Woodworking machinery (exc. container making machinery).
J-5 Tobacco manufacturing machinery and equipment.
J-5 Ceramic manufacturing machinery.
J-5 Can making and can closing machines.
J-5 Wire working machinery.
J-5 Anodizing equipment.
J-5 Electroplating equipment.
J-5 Magnets, electrical lifting.
J-5 Bottling machines.
J-5 Case packers.
J-5 Case sealing machines.
J-5 Packaging machines.
J-5 Wrapping machines.
J-5 Pressure vessels.
J-5 Chains, industrial power transmission.
J-5 Metallic tubing, and hose, flexible.
J-5 Carbon brushes (including automotive).
J-5 Carbon products, industrial, molded or extruded from a petroleum coke, graphite or other carbon base (other than brushes), except graphite electrodes over 1 in. in diameter and graphite electrolytic anodes.

NO SHARK: This U. S. Army bomber made her way back to her advanced base in Tunisia in spite of severe damages absorbed during a raid on the Tunisian front. *Press Assn.*



Health, Safety and Technical Supplies Division

J-6 Fire extinguishers and fire extinguishing accessories (aircraft).
J-6 Kits, emergency (aircraft).
J-6 Litters (aircraft).
J-6 Fire apparatus, motorized and auxiliary.
J-6 Optical and ophthalmic goods making machinery.
J-6 Physiotherapy apparatus, electrical.
J-6 X-ray apparatus and tubes.
J-6 Safety equipment, industrial.
J-6 Automatic sprinkler systems.
J-6 Fire extinguisher systems, piped and generator sets.
J-6 Fire extinguishers, portable; and stirrup pumps.
J-6 Fire hose, hose dryers, racks, reels, and related products.
J-6 Alarm and signal systems, protective.
J-6 Engineering instruments and equipment (including surveyors, drawing and mathematical).
J-6 Balances and weights (laboratory).
J-6 Analytical and industrial testing instruments and apparatus (laboratory).
J-6 Magnifiers, microscopes, and microtomes.
J-6 Physical chemistry and chemical physics instruments and apparatus.
J-6 Physics apparatus (for study of physics).
J-6 Blowers and vacuum pumps (laboratory).
J-6 Constant temperature apparatus and devices (laboratory).
J-6 Chemical laboratory apparatus.
J-6 Surgical and medical instruments and equipment.
J-6 Dental instruments, apparatus, and equipment.
J-6 Dental supplies and appliances.
J-6 Ophthalmic goods.
J-6 Surgical and medical supplies and orthopedic appliances.
J-6 Research laboratories (services).

BUT NOT A HEADACHE IN A CARLOAD
Of A-F METAL PRODUCTS CLEANING MACHINES
For (Airplane Engine Manufacturer's Name Censored)

HERE are 8 more A-F Metal Products Cleaning Machines which will soon be speed-cleaning airplane engine gears, wrist pins, connecting rods, valves and other small metal products.

PRECISION engineered, sturdy, trouble-free as is all A-F Cleaning and Finishing Equipment, these machines are built to outlast the war by many years.

IF YOU are producing war materials, write today for our newest illustrated folder depicting various types of A-F Cleaning and Finishing Equipment for war-time and post-war production.

The ALVEY-FERGUSON CO.
626 Disney St., Cincinnati, Ohio

CONVEYING EQUIPMENT
Alvey-Ferguson
METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

Mining Division

J-7 Crushing and grinding machinery, stationary (mine and smelter types).
J-7 Cars and locomotives, underground mine haulage.
J-7 Coal cutting machines.
J-7 Conveyors, portable underground mine type.
J-7 Hoists, mine types.
J-7 Ore dressing and coal preparation equipment (exc. crushers and grinders).
J-7 Mine loaders, underground.
J-7 Smelting and refining equipment (exc. furnaces).
J-7 Mining equipment, specialized.
J-7 Diamond core drills.

Plumbing and Heating Division

J-8 Dishwashing and glasswashing machinery, commercial.
J-8 Sanitary ware, plumbing.
J-8 Plumbing fixtures, fittings and trim.
J-8 Boilers, low-pressure, cast-iron.
J-8 Boilers, low-pressure, steel.
J-8 Coils, blast heating.
J-8 Convectors, heating.
J-8 Radiators, cast iron.
J-8 Cooking stoves and ranges, domestic (exc. electric).
J-8 Cooking equipment, commercial (exc. electric).
J-8 Food preparation and serving equipment (steam connected).
J-8 Heating stoves, domestic (exc. electric).
J-8 Unit heaters and unit ventilators.
J-8 Warm air distribution equipment, registers, stove and smoke pipe.
J-8 Warm air furnaces.
J-8 Burners, gas industrial.
J-8 Burners, oil.
J-8 Burners, combination oil and gas (industrial).
J-8 Gas conversion burners, domestic.
J-8 Oil burners, domestic.
J-8 Stokers, domestic.
J-8 Heating system controls.
J-8 Hot water equipment, domestic (exc. electric).

Radio and Radar Division

J-9 Capacitors, fixed, radio and radar.
J-9 Coaxial cable, radio frequency.
J-9 Condensers, radio and radar.
J-9 Crystal assemblies, radio and radar.
J-9 Filters, radio and radar.
J-9 Microphones, radio and radar.
J-9 Resisters, radio and radar.
J-9 Sockets, radio and radar.
J-9 Speakers, radio and radar.
J-9 Test sets, standard, radio and radar.
J-9 Vibrators, radio and radar.

J-9 Tubes, radio and radar.
J-9 Control valves and regulators, industrial type.
J-9 Instruments, combat type (exc. fire control equipment, aircraft, and navigation instruments).
J-9 Instruments, industrial type (for plant facilities, etc.)
J-9 Radio hardware.
J-9 Hardware and sprockets, radio and radar.

Shipbuilding Division

K-1 Valves, steel.
K-2 Valves, except steel.
K-3 Pipe fittings, steel.
K-3 Pipe fittings, except steel.

Tools Division

K-4 Bearings, anti-friction (aircraft).
K-4 Bearings, ball and roller (except aircraft and main thrust bearing for ships).
K-5 Machine tools, non-portable.
K-5 Machine tools and metal-working machinery attachments and accessories.
K-6 Tools, metal-cutting.
K-7 Tools, small (aircraft).
K-7 Cranes, hoists and winches.
K-7 Die casting and molding machines, metal.
K-7 Extruding machines, metal.
K-7 Forging machines.
K-7 Presses, hydraulic and mechanical (metal working).
K-7 Roll bending, plate bending, pipe bending and other structural shape bending machines.
K-7 Shears, punches and nibblers (power-driven).
K-7 Foundry machinery, equipment and supplies.
K-7 Heat treating equipment, metal.
K-7 Metal-working machines and tools, portable.
K-7 Furnaces, electric, metal-melting.
K-7 Files and rasps.
K-7 Tools, mechanics' hand service.
K-7 Gages and machinists' precision measuring tools.
K-7 Chains, monel-metal.
K-7 Chains (exc. anchor, power transmission, and monel metal chains).
K-7 Abrasive products, manufactured.

Transportation Equipment Division

B-2 Internal combustion engines--locomotives.
K-8 Railroad car accessories.
K-8 Railroad locomotive accessories.
K-8 Rapid transit and street railway car accessories.
K-8 Trolley bus and motor bus accessories.
K-8 Brake actuating mechanisms, air.
K-8 Railroad and transit maintenance of way work equipment.
K-8 Railroad and transit track equipment.
K-8 Railroad and transit signal equipment.
K-8 Repair shops, railroad transportation equipment.
S-4 Blast detonating equipment.
S-4 Sewer cleaning equipment and machinery.
S-4 Meat packing house machinery.
S-4 Chemical producing machinery.
S-4 Paint and varnish making machinery.
S-4 Drug, pharmaceutical and cosmetics machinery.
S-4 Plastic molding machinery.
S-4 Fertilizer machinery and equipment.
S-4 Salt processing machinery.
S-4 Animal and fish oil machinery and equipment.
S-4 Vegetable oil machinery and equipment.
S-4 Cooking utensils, glass.

Cork Division

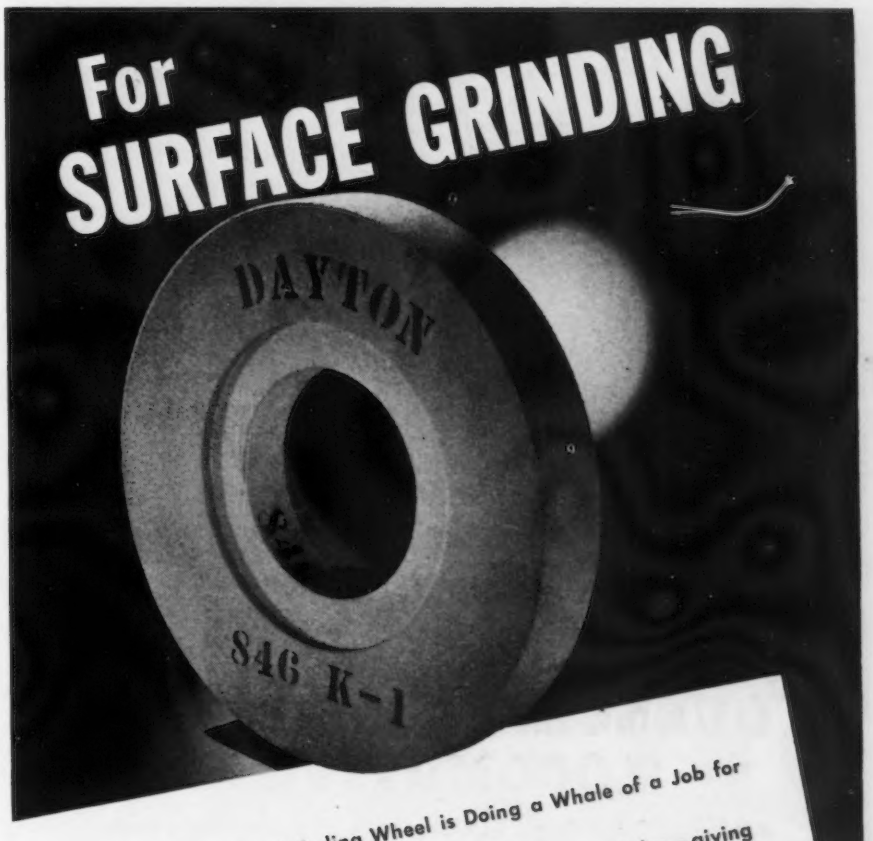
S-4 Asbestos building materials.
S-4 Asbestos textiles.
S-4 Fibrous glass products.
S-4 Cork products.

Miscellaneous Minerals Division

S-4 Diamond dies.
S-4 Brazing alloys.
S-4 Ferro-cerium.
S-4 Jewel bearings.

Printing and Publishing Divison

S-4 Loose-leaf binders.
S-4 Printing rollers.
S-4 Presses, lithographic and printing.
S-4 Power cutting machines (printing).
S-4 Paper folding machines (printing).
S-4 Wire stitching machines (printing).
S-4 Paper drilling machines: Hand lever; foot power (printing).



This 846 K-1 Dayton Grinding Wheel is Doing a Whale of a Job for Hundreds of Users.

EXAMPLE NO. 1. Surfacing mild steel on hydraulic grinder—giving maximum stock removal with a minimum of wheel wear.

EXAMPLE NO. 2. Precision grinding of hardened steel parts—with high production efficiency and giving excellent finish.

EXAMPLE NO. 3. Many users of this wheel have found it ideal for surfacing varied materials, saving time usually required to change wheels.

If you have a problem in surfacing or any other grinding that you haven't solved to your complete satisfaction, we may have the answer. Write, wire, or phone—giving us an outline of your problem—and one of our experienced engineers will serve you promptly and efficiently. We may have what you need in stock.

DAYTON GRINDING WHEELS

SIMONDS WORDEN WHITE COMPANY
DAYTON, OHIO
711 NEGLEY PLACE

S-4 Paper perforating machines (printing).
S-4 Blue printing developing and drying machines.
S-4 Complete fonts of composing machine matrices (printing).
S-4 Composing machine molds (printing).
S-4 Remelt furnaces and molds (printing).
S-4 Complete fonts of foundry type (printing).
S-4 Casting boxes (printing).
S-4 Whirlers (printing) (plate coating machines).
S-4 Plate graining machines (printing).
S-4 Opaquing and line-up tables (printing).
S-4 Photo-engraving screens.
S-4 Vacuum frames (printing).

Service Equipment Division

S-4 Vacuum cleaners, industrial.
S-4 Office machinery.
S-4 Scales and balances (exc. laboratory).
S-4 Laundry, dry cleaning and pressing machinery, commercial.
S-4 Laundry machinery, domestic.
S-4 Floor finishing and floor maintenance machines.
S-4 Electric and elevator repair shops.
S-4 Mechanical repair shops.
S-4 Electroplaters, galvanizers and other metal coaters (services).

Steel Division

S-4 Nails (exc. steel wire nails).
S-4 Castings, iron, rough.

Textiles, Clothing and Leather Division

S-4 Rope (aircraft).
S-4 Cotton ginning and delinting machinery.
S-4 Sewing machines, industrial.
S-4 Textile machinery.
S-4r Leather working machinery.
S-4 Broom, brush and mop making machinery.
S-4 Bag filling and closing machines.
S-4 Mattresses.
S-4 Hooks and eyes, slide and snap fasteners, buckles, buttons, and miscellaneous apparel findings.
S-4 Brushes: Fiber, steel, wire.
S-4 Cut tacks.

Various

S-4 Repair shops (exc. electric, elevator and mechanical repair shops); (services).

COKE OVEN EQUIPMENT

QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars
Scale Charging Cars
Electrically Operated Cars for Every Haulage Purpose
Locomotives for Switching and Interplant Haulage
Turntables

The ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

Ore Traffic Frozen Possibly Until May

Washington

• • • **With an all-time** high total of 95,000,000 tons of iron ore to be moved this season from the upper to the lower Great Lakes, carriers still are unable to break through the thick Lake ice to take on cargoes at Lake Superior docks, ODT said Monday. Officials said, "the opening date of the upper Lakes navigation season still cannot be predicted and it now appears possible operations may not begin before May 1." The ODT pointed out that some 8,650,000 tons of ore was loaded before May 1 last year.

For more than two weeks a car ferry has been breaking ice in the Strait but after a small number of vessels had plowed through to open water another blizzard closed the straits Sunday.

Fontana Plant Correction

• • • **In the story** on the Kaiser plant at Fontana, Cal., THE IRON AGE of April 15, page 81, omitted a phrase that caused a distortion in the following sentence: "Four of the open hearths will make carbon steel for the alloy finishing mill." The sentence should have read as follows: "Four of the open hearths will make carbon steel and the remaining two will make alloy steel for the alloy finishing mill."

Supplies Assured Transportation Lines

Washington

• • • **WPB last week** issued Order P-142 as amended to provide for a steady flow of materials entering into the operations of transportation systems during the time required for the changeover from Order P-88, which was superseded by P-142 on April 5, 1943. Under P-142 as originally issued, operators would technically have been unable to extend a preference rating until they had applied for and received a serial number under the new order. Also, P-142 requires the use of Form PD-844, in place of Form PD-351, which was used under Order P-88.

The amended regulation provides that until an operator receives his serial number under the new order he may use on the certification which must accompany an order for maintenance, repair and operating supplies the CMP allotment symbol MRO-P-88 plus his serial number under P-88. Likewise, the amendment provides that to the extent that an operator continues to receive ratings and authorizations on Form PD-351 for the second quarter of 1943, PD-351 shall be considered equivalent to PD-844.

•

Critical Materials Cut To Hand Truck Makers

Washington

• • • **Order L-111** has been amended by WPB to restrict the use of steel, iron, aluminum and other critical materials in the manufacture of hand trucks and related material-handling equipment. The order was made effective immediately but equipment in the process of manufacture on April 23 or for orders accepted prior to that date was exempted. Also exempted were deliveries to or for the direct use of armed services until 90 days after the effective date of the order.

The order covers trucks, lift trucks, dollies, trailers, etc. (not self-propelled) which are used for transporting material in industrial plants, warehouses, railroad depots, docks and for similar purposes.

•

New Order Controls Anti-Friction Bearings

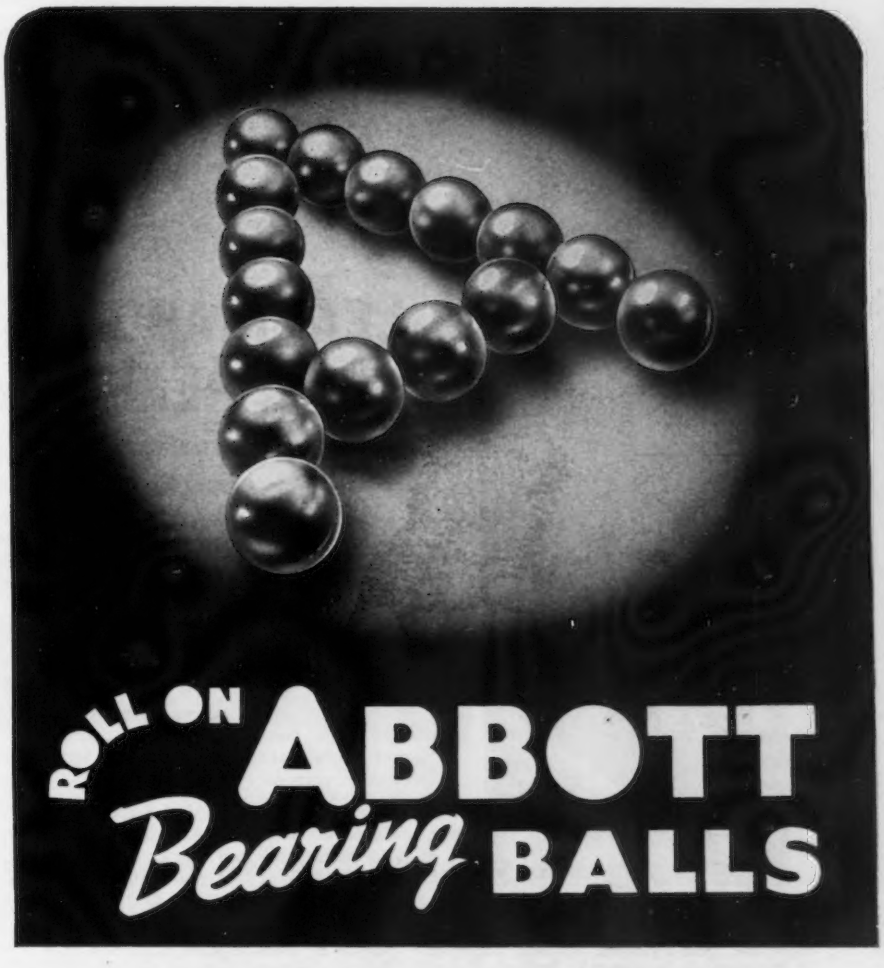
Washington

• • • **Additional controls** over scheduling the production and distribution of anti-friction bearings are established by General Preference Order E-10 issued last week by WPB. The present order supplements M-293 by the inclusion of special features which are not covered by it. Among the features are the following:

Commencing June 1, each producer shall schedule his production of bearings for successive 90-day periods.

Production is to be scheduled by producers so that 85 per cent of each quarter's bearings will go to fill "production orders," which are defined.

The other 15 per cent of each producer's schedule is to be devoted to miscellaneous orders. A miscellaneous order is defined as any purchase order or contract for bearings other than production orders; provided, however, that no person shall subdivide his purchase orders or contracts for the purpose of coming within this definition.



STAMINA is Vital

Rely on these performance-proved components to contribute to and safeguard the dependability expected of YOUR OWN products.

We can supply the grade of ball that will match your own Standards of Precision.

THE ABBOTT BALL COMPANY
HARTFORD, CONN., U. S. A.

Inventories of Production Gages Protected by E-5-a

• • • **Production gages are exempted** from the provision placing a limitation on users' and distributors' inventories by General Preference Order E-5-a as amended April 17 by WPB. The original order required that a purchase order be accompanied by a certification that it does not increase the purchasers' inventory beyond a 30-days' supply. The amended order exempts production gages from this requirement and, on Schedule B lists the types of production gages covered by the exemption.

P-134 Revoked to Stop Conflict With CMP-Reg. 5

• • • **WPB announced the** revocation of Order P-134 last week to prevent confusion with CMP Regulation No. 5, which went into effect on April 1, 1943. The P-order assigned preference ratings for the acquisition of necessary repair and maintenance materials by producers of copper, zinc and alloys of those metals.

CMP Regulation No. 5 provides a method for acquisition of maintenance, repair and operating materials by these producers, as well as by manufacturers of many other products.

Paper Work Aided By Form WPB-732

• • • Some 15,000 manufacturers working on the principal war contracts will receive a revised WPB questionnaire (WPB-732) combining two previous questionnaires and designed to simplify reporting to the Board. This form combines the Plant Report of Operations (WPB-732) with the Quarterly Report on Shipments of Products and Inventories of Critical Materials (CMP-7). It eliminates the necessity of an additional questionnaire on the consumption of power.

Pipe Fittings Order Issued

Washington

• • • **Grey cast iron,** malleable iron and brass and bronze pipe fittings hereafter will be administered under Order L-288, issued last Friday by WPB, instead of under Schedule II of Order L-42. Schedule II of L-42 is revoked and its provisions are incorporated without modification in L-288.

DPC Contracts Announced

General Electric Co., Schenectady, N. Y., to provide additional equipment and machinery for a plant in Massachusetts at a cost in excess of $750,000, making a total commitment of more than $5,800,000.

Canton Drop Forging & Mfg. Co., Massillon, Ohio, to provide facilities for a plant in Ohio at a cost in excess of $4,000,000.

Vermont Marble Co., Proctor, Vt., to provide additional equipment for a plant in Vermont at a cost in excess of $20,000, making a total commitment of more than $170,000.

H. K. Porter Co., Inc., Pittsburgh, to provide additional equipment for a plant in Pennsylvania at a cost in excess of $25,000, making a total commitment of more than $125,000.

Bendix Aviation Corp., Bendix, N. J., to provide additional facilities at a plant in New Jersey at a cost in excess of $530,000, making a total commitment of more than $50,000,000.

Maryland Sanitary Mfg. Co., Baltimore, to provide additional plant facilities in Maryland at a cost in excess of $240,000, making a total commitment of more than $1,500,000.

Koppers Co., Baltimore, to provide equipment and machinery for a plant in Maryland at a cost in excess of $450,000.

Commodity Credit Corp., Washington, D. C., to provide plant facilities in Illinois and Wisconsin at a cost in excess of $350,000 each.

Washington Iron Works, Seattle, Wash., to provide additional machinery and equipment for a plant in Washington at a cost in excess of $120,000, making a total commitment of more than $250,000.

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Copies of Treatise on Planers have recently been bought by executives and engineers of Acme Machine Tool Co., Allis Chalmers, American Locomotive, American Can, American Type Founders, Baldwin Locomotive, Bausch & Lomb, Bullard, Canadian Car & Foundry, C. B. Cottrell, DuPont, Fairchild Aircraft, General Electric, Giddings & Louis, General Motors, Hudson Bay Mining, International Harvester, Joshua Hendy, Landis Machine, Lodge & Shipley, Glenn L. Martin, National Cash Register, Procter & Gamble, R. C. A.-Victor, Thompson Products, Taylor Winfield, Republic Steel, Revere Copper, Warner & Swasey and Westinghouse, to mention only a few.

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COMPANY .....

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This Week's Priorities and Prices

Anti-friction bearing production and distribution is placed under tighter control under Order E-10. (WPB-3187)

Certain copper products may be sold to brass and bronze makers at brass mill prices under Amendment No. 7 to Revised Price Schedule No. 12. (OPA-2262)

Use of steel, iron, aluminum and other critical materials in the manufacture of hand trucks and related material-handling equipment is restricted by Order L-111 as amended. (WPB-3179)

Maximum prices for used steel containers apply to sales by emptiers to any purchasers under Amendment No. 3 to Revised Price Schedule No. 43. (OPA-T-765)

Grey cast iron, malleable iron and brass and bronze pipe fittings are controlled under L-288. (WPB-3208)

Premium prices have been granted the Metal Reserve Co. for higher grade fluorspar under Maximum Price Regulation 126, Amendment 2.

■ ■ ■

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (*For example,* WPB-600 *means announcement* 600 *issued by the War Production Board.*)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

"M" Orders:

M-15-g...Order places restrictions on rubber tires for industrial power trucks (4-12-43).

M-15-g...Amendment extends replacement for use period on applications for new power truck tires from 15 to 30 days (4-14-43).

M-302...Amended order restricts the use of mosmium in instruments and articles of war (4-16-43).

"P" Orders:

P-134...Revoked (4-15-43).

P-142...Amended order allows buyers of material for transportation systems to use their old serial numbers (4-13-43).

"E" Orders:

E-5-a...Amended order exempts production gages from the provision placing a limitation on users' and distributors' inventories (4-17-43).

E-10...Order controls scheduling of anti-friction bearings which are considered critical components (4-13-43).

"L" Orders:

L-41-d...Order exempts asbestos siding and roofing from regulations (4-16-43).

L-42...Schedule II revoked (4-17-43).

L-75...Interpretation No. 1 clarifies the grate dimension and feeding capacity of Class A stokers (4-12-43).

L-111...Amended order restricts use of critical materials in the manufacture of hand trucks (4-13-43).

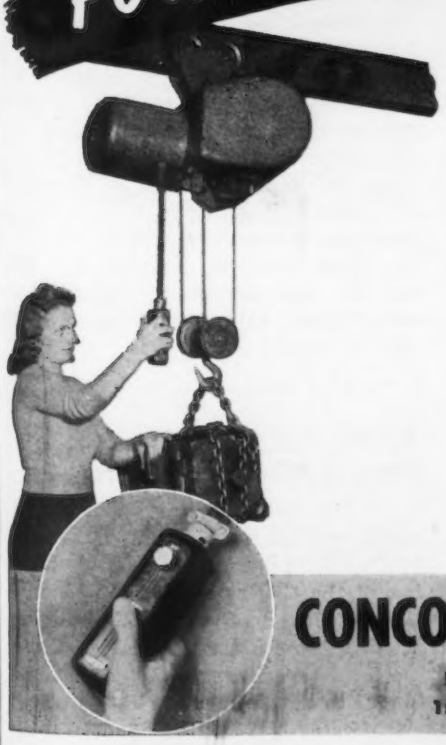
L-138...Amended order modifies restrictions on deliveries of refrigerating and air conditioning machinery and equipment (4-14-43).

L-159...Amended order exempts plastic molding from certain regulations (4-15-43).

L-246...Order raises priorities on liquid pumps (4-12-43).

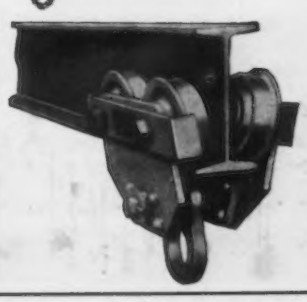
L-288...Order controls grey cast iron, malleable iron and brass and bronze pipe fittings (4-17-43).

Here's Safe Easy Strength... FOR THE WEAKER SEX



The Conco Torpedo Electric Hoist has many features which adapt it ideally to operation by women. First, push button control allows for easy, one-hand operation. Double cast iron drums balance the load with a minimum of effort from the operator. An electric brake and positive limit switch are important safety features. Available for prompt delivery in 250-, 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Write for bulletins.

Illustrating four units of Conco's complete line of hand-powered and electric cranes, hoists and trolleys. Write for bulletins on the equipment needed.



CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company

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Manufacturers Urged to Make Allotments

• • • **The flow of materials** into war production is threatened by the failure of some manufacturers who have received allotments under the Controlled Materials Plan to pass on authorizations in proper form to their suppliers, the CMP Division of WPB said last week.

Producers operating under CMP, whose suppliers receive allotments through them, must do two things immediately to make sure that they will receive parts and materials when needed: (1) authorize production schedules for their suppliers and (2) make allotments of the necessary controlled materials to the suppliers. A manufacturer cannot make an allotment without authorizing a production schedule, and an authorized production schedule without an allotment normally cannot be carried out.

A production schedule may be authorized on forms available in WPB field offices. An alternative procedure is provided in paragraph (n) (2) of CMP Regulation No. 1, under which the delivery date specified on an order constitutes an authorization of the minimum production schedule necessary to make delivery on time.

Allotments of controlled materials may be made to a supplier on Form CMP-5 as provided in Schedule II of CMP Regulation No. 1, or on Form CMP-4A, at the time a production schedule is authorized. The allotment must specify the amount of controlled material allotted and must bear the abbreviated allotment numbers.

All Buyers Protected On Steel Drum Ceilings

• • • **Maximum prices** for used steel containers apply to sales by emptiers to any purchasers, the OPA said April 16.

This is made plain in Amendment No. 3 to Revised Price Schedule No. 43, Used Steel Drums, Pails and Containers, effective April 22, 1943. By removing the qualification that the emptied containers are priced as sold to a filler, operation of the schedule is extended to cover purchases by any buyers. Thus, those who buy the containers for reconditioning may obtain them at or below ceiling prices.

It is the intention of the price agency to establish dollars-and-cents maximum prices for the reconditioned containers at the earliest opportunity.

Use ASU-40 for Steel Tubing Allocations

• • • A new form has been issued for allotments of steel tubing. For steel allotments, Forms CMP-4A and CMP-4B cover requests for carbon and alloy steel, but not for steel tubing. In order to provide for the allotments for steel tubing, Form ASU-40 has been made available to industry. This is a revision of Form SUWPB-18 and the usual procedure is followed in filling Form ASU-40 requesting allocation of steel tubing. Manufacturers who have not yet received their copies of Form ASU-40 may get them by writing Aircraft Scheduling Unit, Steele High Building, Dayton, Ohio.

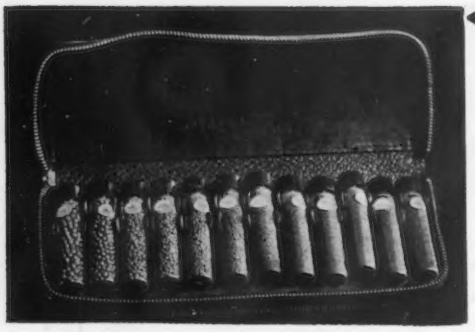
Price Relief Set For Machines and Services

• • • **Manufacturers of machinery** and suppliers of machinery services were notified that OPA will process and review applications for adjustment of maximum prices which they filed with OPA before April 10, under regulatory provisions which will be replaced on that day by new methods based on the essentiality of the product and the production.

The new methods will replace the machinery producers' methods of obtaining adjustment under Procedural Regulation No. 6 only after April 9. Applications filed after April 9 under Procedural Regulation 6 for relief from maximum prices established by Maximum Price Regulation No. 136 will not be granted, but those filed with OPA up to and including April 9 will be considered.

Bittner and Roth Named NWLB Members

• • • **The National War Labor Board** announced the appointment last week by President Roosevelt of Van A. Bittner of the CIO as a labor member of the board and of Almon E. Roth of the California State Chamber of Commerce, as an alternate industry member. Both appointments will fill vacancies created by recent resignations.



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has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

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Plans Forming for More Price Zones

Washington

• • • **Progress is being** made toward establishing specific maximum prices for heavy line iron and steel warehouse products for zones in addition to the four Eastern ones made effective April 15, OPA has pointed out. The specific maximum prices are to replace those established under a "freeze date and formula" method and are fitted to marketing areas.

The statement followed a meeting that was called on April 15 at Washington and was attended by 16 prominent heavy line warehousemen from central western and western states extending as far as the Rockies. The conference followed a meeting on April 2 of members of the industry from 11 eastern and mid-western states to discuss specific maximum prices for zone 5, and was devoted to discussion of proposals by industry members concerning trading areas in 16 states that will be in zones 6 to 9 inclusive.

This territory includes parts of Indiana and Michigan and all of Wisconsin, Illinois, Minnesota, Iowa, Missouri, Arkansas, North and South Dakota, Nebraska, Kansas, Oklahoma, Montana, Wyoming and Colorado.

Within the next several weeks meetings will be held with industry representatives from southern and far western states, although the exact dates for them have not been determined.

Recent CMP Revisions and Directions

Aluminum rod and bar users have been granted protection from displacement of their orders for these products in mill production schedules until May 1, under the terms of Direction No. 2 of CMP Regulation No. 1.

•

Manufacturers of marine lighting equipment and wiring devices have been ordered to classify their products. (CMPL-186)

•

General steel warehouses have been instructed, when placing orders for carbon steel, to specify delivery in the second quarter of 1943. (CMPL-187)

•

Controlled materials producers have been authorized under CMP Regulation No. 8 to assign Symbol XI and preference rating AA-1 to deliveries of production materials other than controlled materials, which will be physically incorporated into their products. (CMPL-166)

•

Primary and secondary brass mills, copper wire mills, brass or bronze foundries, brass mill warehouses and copper wire mill warehouses have been notified that they must report deliveries made on priorities and, separately, deliveries made on allotments. (PDL-2074)

•

Steel orders shipped after June 30 must be covered by allotment numbers. (CMPL-195)

•

A new set of Class B Product Symbols has been assigned to items falling within the jurisdiction of the various Industry Divisions of WPB. (WPB-3174)

•

Producers operating under CMP, whose suppliers receive allotments through them, must (1) authorize production schedules for their suppliers and (2) make allotments of the necessary controlled materials to the suppliers. (WPB-3193)

•

Rolling mills and allied equipment hitherto listed as a Class B product has been removed from the list, inasmuch as this designation is too inclusive. (CMPL-184)

•

The symbol "FC" will be used by the Steel Division to identify allotments of controlled materials made to steel producers on Form CMP-4B for the second and third quarters of 1943 under CMP Regulation No. 8. (CMPL-199)

•

Pattern equipment is a B product, and aluminum castings for patterns are obtained under CMP Regulation No. 1. (CMPL-196)

•

Can manufacturers in Washington, Oregon, California and Utah have been granted relief from inventory restrictions on tinplate imposed by CMP Regulation No. 2. (WPB-3220)

▪ ▪ ▪

For copies of above announcements address Office of War Information. Washington, giving announcement number as shown in parentheses after each paragraph.

PERSONALS

• **W. J. North** has been appointed works manager of the J. G. Brill Co., Philadelphia. Mr. North was formerly factory supertintendent for the Packard Motor Car Co. at Detroit.

• **Henry A. Christy** has been named works manager of the C. O. Bartlett & Snow Co., Cleveland, succeeding **C. J. Neville** who is now vice-president and treasurer. Mr. Christy joined Bartlett & Snow as production clerk in 1923, was made assistant production manager in 1925, production manager in 1928, and superintendent in 1936, which job he held until appointment as works manager. He was also elected to the board of directors in 1942.

• **A. J. Bronold** has been appointed assistant to vice-president, Westinghouse Electric & Mfg. Co. Mr. Bronold, who has been manager of the company's Los Angeles office since March, 1941, will make his headquarters in Pittsburgh. He will devote his attention to general marketing policies of the company. Succeeding Mr. Bronold as Los Angeles manager is **Walter G. Willson**, for the past 18 years Westinghouse manager at Phoenix, Ariz.

• **C. H. Weaver** has been named manager of the marine section of the industrial department of the Westinghouse Electric & Mfg. Co. He succeeds **J. R. Fulton**, who has been appointed assistant to the manager of the company's industrial department. Mr. Weaver has been a member of the marine section for the past three years.

• **J. R. Fulton** has been made assistant to the manager of the industrial department of the Westinghouse Electric & Mfg. Co. Formerly manager of the company's marine section, Mr. Fulton has been assigned special duties principally in the marine field.

• **Joseph P. Kittredge**, for many years manager of the steel castings plant of the National Malleable & Steel Castings Co., Sharon, Pa., has been granted a leave of absence and has taken a position as consultant on the staff of H. A. Brassert & Co., New York. Mr. Kittredge patented and developed a process for centrifugally casting steel wheels which has been in continuous operation for 15 years. Among his duties will be furthering the company's sponge iron development for producing melting stock for iron and steel foundries.

W. J. NORTH, works manager, J. G. Brill Co., Philadelphia.

HENRY A. CHRISTY, works manager, C. O. Bartlett & Snow, Cleveland.

• **Edgar N. Yost** has been appointed division superintendent of the Gary armor plate plant of Carnegie-Illinois Steel Corp. Mr. Yost's assistant in the armor plate division is **Thomas J. Griffin. E. C. Vedell** is assistant to the division superintendent. Others appointed in the armor plate plant supervisory force are: **T. H. Sanderson**, superintendent of quality control; **G. P. McAleer**, superintendent of maintenance; **P. W. Bennington**, division industrial engineer; **W. G. Hawley**, superintendent of production control; **W. G. Stuhlmacher**, assistant to division superintendent, fuel; **J. E. Clark**, assistant to division superintendent, power; **G. A. Marks**, assistant works auditor; **O. B. Canaday**, assistant superintendent of plant protection, and **A. H. Kofoed**, assistant superintendent of industrial relations. **W. M. Jenks** as general superintendent of Gary works also has general supervision over the armor plate division.

• **H. F. Clarke** has been appointed director of spring mill products of the American Steel & Wire Co., subsidiary of the United States Steel Corp., succeeding **Leonard C. Peskin**, resigned. Mr. Clarke's first association with the wire company was in December, 1936, when he started as a technical apprentice at Central Works, Worcester, Mass. In March, 1938, he was transferred to South Works, where he was employed in several positions before being named assistant superintendent of the spring mill in September, 1941, which position he has held to the present time.

• **Frank S. O'Neil**, general manager of the Indianapolis operations of Link-Belt Co., has been promoted to vice-president. Vice-president **James S. Watson**, Indianapolis, who has just rounded out 50 years of service, plans to retire at the end of this year from active duty. He continues as a director of the company.

M. O'Neil joined the Link-Belt organization at the company's Pershing Road plant in Chicago, and has been general manager at Indianapolis since 1939.

• **Dr. Leo Schapiro** has been appointed to the staff of Southwest Steel Rolling Mills, Los Angeles, as chief metallurgist and general superintendent. Dr. Schapiro is an authority in the heat treating, rolling, and melting of carbon and alloy steels by the open hearth and electric furnace processes. He was recently assistant chief metallurgist at the United States Steel Corp. South Works, Chicago, and was research metallurgist in that plant for several years.

• **John W. Hacker** has recently been appointed general superintendent of the Christy Park Works, McKeesport, Pa., of the National Tube Co., succeeding Walter T. Mahla, who died recently. Mr. Hacker joined this company in April, 1940, as industrial engineer at the National Works, McKeesport, Pa., and in March, 1942, became chief industrial engineer of the company with offices in Pittsburgh. He has had operating experience with the Crucible Steel Co. of America and Republic Steel Corp., and was later associated with Dyer Engineers, Inc.

• **Keith Powlison** has been elected vice-president and controller of the Armstrong Cork Co., Lancaster, Pa.

A. J. BRONOLD, assistant to vice-president, Westinghouse Electric & Mfg. Co., East Pittsburgh.

M. J. Warnock will succeed Mr. Powlison as company treasurer and **Cameron Hawley** has been appointed director of advertising and promotion to succeed Mr. Warnock.

• **Robert K. Kulp** has been appointed director of research by the Jessop Steel Co., Washington, Pa. He was formerly associated with the Steel and Tube Division of Timken Roller Bearing Co., as research metallurgist, and previous to that, with Lukens Steel Co., in the same capacity.

Mr. Kulp entered the steel industry as a student engineer with the American Steel and Wire Co. in 1929. He is a member of the American Society of Metals and the American Foundrymen's Association. His headquarters will be at the main office and works, Washington, Pa.

• **Alfred P. Sloan, Jr.**, chairman of the board, General Motors Corp., has been named chairman of the National Industrial Information Committee. He will succeed **J. Howard Pew**, president of Sun Oil Co., Philadelphia.

• **Nathaniel C. Fick** has been appointed to the research staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of metallurgical research. Prior to joining the Battelle staff, Mr. Fick was a metallurgist at the Gary (Indiana) plant of the Carnegie-Illinois Steel Corp., and a war training instructor at Purdue University.

• **Nathaniel Arbiter**, former research assistant at Columbia University, has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of mineral dressing and materials beneficiation research.

• **Frederick L. Theurer**, associated with the Milwaukee office of the Pittsburgh Plate Glass Co. for 32 years, has been appointed divisional director at Milwaukee in charge of the paint division.

• **Edmund Fitzgerald**, vice-president of the Northwestern Mutual Life Co., Milwaukee, has been elected a director of Cutler-Hammer, Inc., Milwaukee, to succeed the late Max Babb.

• **Carl J. Zaiser**, president of Ampco Metals, Inc., Milwaukee, has been appointed chairman of the safety division of the Milwaukee Association of Commerce and as such is in charge of the annual foremen's school.

• **Thomas J. Adams** has been appointed chief metallurgist of the Columbia Steel Co., Torrance, Cal., plant succeeding the late John Disario.

• **Glen A. Lloyd**, head of the price adjustment section of the Chicago Ordnance District, has been assigned to Washington to assume duties as assistant director for price in the purchasing division of the War Department. Mr. Lloyd will be in charge of all pricing activities and cost analysis for the war department. He joined the Chicago ordnance staff in June, 1942. Previous to that he was a partner in the law firm Bell, Boyd & Marshall.

• **W. R. Odell, Jr.**, has been appointed to succeed Mr. Lloyd as chief of the price adjustment staff, Chicago Ordnance District. Before joining the ordnance district staff in August, 1942, Mr. Odell was assistant treasurer of the International Harvester Co. In his new capacity he will be in charge of price negotiation between the government and ordnance contractors.

• **Frederick Salditt**, vice-president in charge of sales, Harnischfeger Corp., Milwaukee, has been elected a member of the board of directors to fill the vacancy of the late Joseph H. Harnischfeger. Mr. Salditt has been associated with the company since 1923.

Other appointments announced by the company are: **H. H. Erkelenz**, executive engineer, has been made vice-president in charge of engineering; **Herman Menck**, works manager, has been made vice-president in charge of manufacturing; **W. F. Heilman** has been elected secretary of the company, and **F. J. Hartmann** has been appointed assistant secretary and assistant treasurer.

OBITUARY...

• **Charles Bock**, president of M. Meyer & Son, Inc., scrap iron and steel dealers, died March 19 at his home in Buffalo. He was 66 years old.

• **Howard J. Ellfeldt**, vice-president of the Ellfeldt Machinery & Supply Co., Little Rock, Ark., died March 4. With Prices

• **Jean R. Adrian**, research engineer at the General Electric Co. Lynn plant, died in that city April 2. He was 42 years old.

• **Winfield D. Zimmerman** collapsed while helping to set up the exhibit of the Wetmore Reamer Co. at the exposition held by the Tool Engineers' in connection with the Milwaukee convention. He was 44 years old.

• **Edward B. Kennedy**, for 18 years manager of the Milwaukee sales office of the Crane Co., died at a hospital there after a long illness. He was 46 years of age and well known in plumbing and heating circles in Wisconsin.

• **John M. Kerr**, chief engineer of Bay City Shovels, Inc., Bay City, Mich., died of a heart attack at Washington, April 1, shortly before he was to attend a committee meeting of the War Production Board. Mr. Kerr was chairman of the Bay City Manufacturers Association.

• **Edward J. Marr**, safety engineer at the Bethlehem Steel Co. Fore River Works, died March 20. He was 50 years old.

• **Edward J. Fleming**, founder and president of the Fleming Foundry Co., Springfield, Mass., died in Florida March 23, aged 73 years.

• **Charles A. Schranz**, general manager of the machinery department of the R. D. Wood Co., died recently, aged 68 years.

• **B. W. Twyman**, former general manager of the old Nash Four plant at Milwaukee, and later manager of the Lavine Gear Co., now the Ben Hur Mfg. Co., Milwaukee, died April 6, aged 73 years.

• **Arthur T. Knoerzer**, vice-president and general manager of the Champion Corp., Hammond, Ind., died March 25.

MACHINE TOOLS

. . . Sales, Inquiries and Market News

Tool Builders Fear Low Ratings

Cincinnati

• • • **Little or no change** is indicated in the district machine tool market. Manufacturers indicate a steady flow of new orders at sufficient rate to warrant full operation for the normal working day, but of course, much below the present three-shift program. There seems to be a feeling among some producers in the area that with the easing of demand and the release of the tension which placed machine tools on the critical list, priority rulings might bring about a more tense problem in obtaining materials. The feeling seems to be that while Washington may take a position that machine tools, being no longer so critical, should not have such high ratings on raw materials.

Many manufacturers seem to feel that the three point program advanced by A. G. Bryant of the Bryant Machinery & Engineering Co. (THE IRON AGE, April 15, p. 102) are cogent and the principles would be of great benefit and help to the industry, if applied. It is constantly a matter of comment among the machine tool men that, prior to the war, the industry passed through a long period of extra lean business and there is no reason why it should not be entitled to the fruit of the great advances made in the engineering of machine tools as well as the other great strides made in the industry.

Cited for Award

o o o

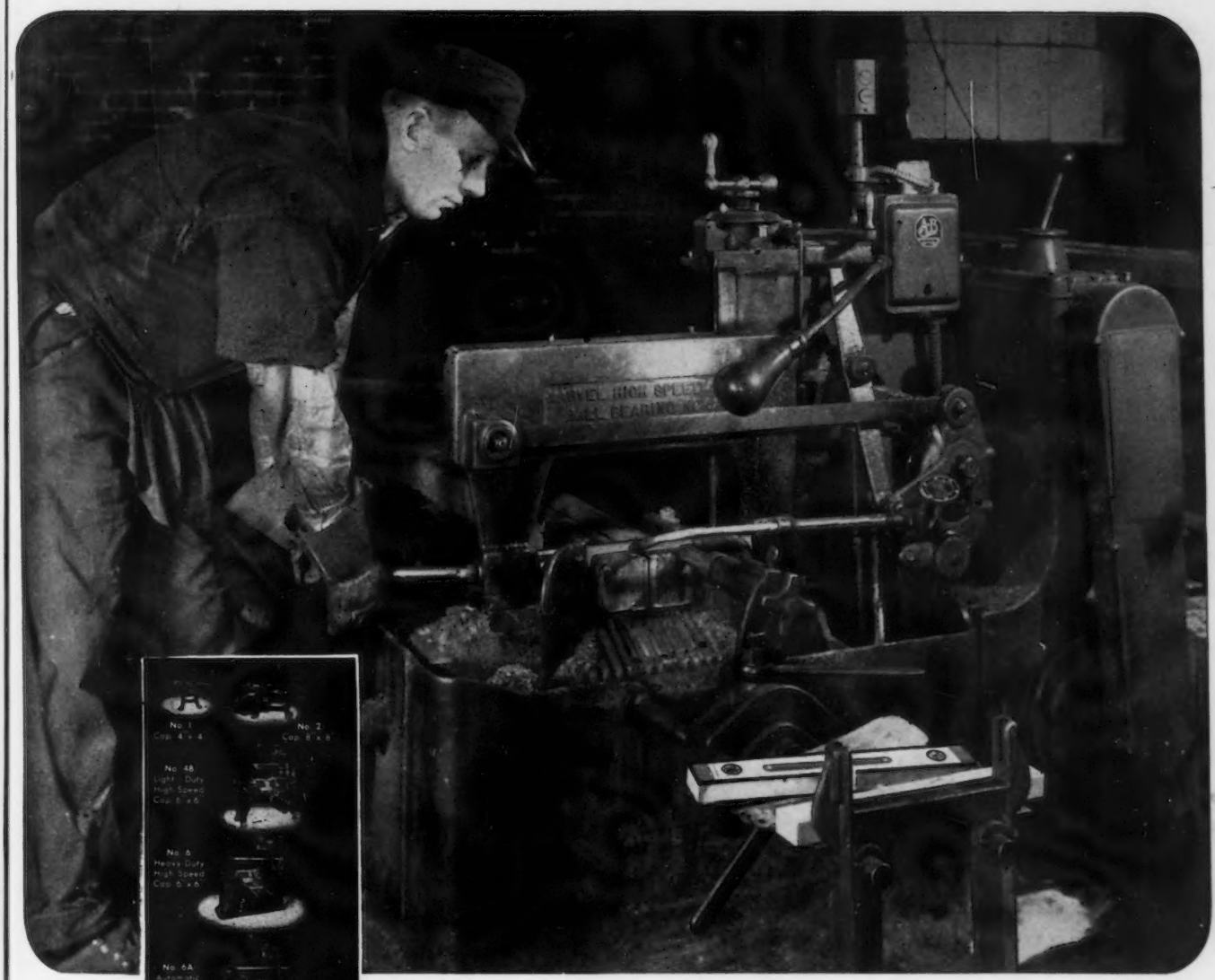
• • • **The Army-Navy "E"** recently has been awarded to the following companies for outstanding performance on war work:

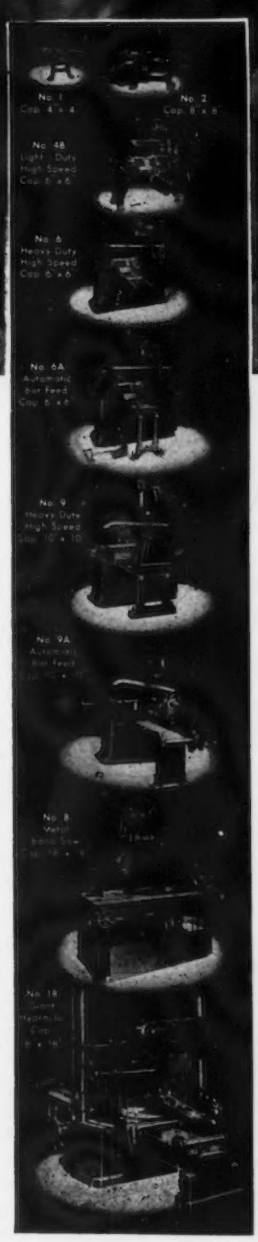
Midwest Piping & Supply Co., St. Louis.
Columbus Bolt Works Co., Columbus, Ohio.
Johns-Manville, Manville, N. J.
Pangborn Corp., Hagerstown, Md.
Sanderson & Porter, Pine Bluff Arsenal, Ark.
William Ainsworth & Sons, Inc., Denver.
American Electric Furnace Co., Boston.
American Electric Furnace Co., Plant 2, Dorchester, Mass.
Ampco Metals, Inc., Milwaukee.
Atlas Powder Co., Ravenna Ordnance Plant, Apco, Ohio.
Bardwell & McAlister, Inc., Hollywood, Cal.
Bronson Reel Co., Bronson, Mich.
Cleaver-Brooks Co., Milwaukee.
The Cleveland Dental Mfg. Co., Cleveland.
Cole of California, Inc., Vernon, Cal.
Consolidated Packaging Machinery Corp., Buffalo.
Defiance Machine Works, Defiance, Ohio.
Dow Chemical Co., Bay City Plant, Bay City, Mich.
The John Douglas Co., Cincinnati.
Driver-Harris Co., Harrison, N. J.
General Motors Corp., Fisher Memphis Aircraft Division, Memphis, Tenn.
The B. F. Goodrich Co., Los Angeles.
Harley-Davidson Motor Co., Milwaukee.
Hawley Products Co., St. Charles, Ill.
Hunter Illuminated Sign Co., Inc., Flushing, N. Y.
Frank Ix & Sons, Inc., Charlottesville, Va.
Frank Ix & Sons, Inc., New Holland, Pa.
R. A. Jones & Co., Inc., Covington, Ky.
A. D. Julliard & Co., Inc., Aragon Mills Division, Aragon, Ga.
Lindberg Steel Treating Co., Inc., Chicago.
Mahoning Valley Steel Co., Niles, Ohio.
Malleable Iron Range Co., Beaver Dam, Wis.
National Pressure Cooker Co., Eau Claire, Wis.
Norwich Pharmacal Co., Norwich, N. Y.
Peerless Woolen Mills, Rossville, Ga.
Charles Pfizer & Co., Inc., Brooklyn.
Proximity Mfg. Co., Greensboro, N. C.
Allegheny Ludlum Steel Corp., West Leechburg Plant, West Leechburg, Pa.
Alvey-Ferguson Co., Oakley, Cincinnati.
Autoyre Co., Oakville, Conn.
Don Baxter, Inc., Glendale, Cal.
Boonton Radio Corp., Boonton, N. J.
Century Engineering Corp., Cedar Rapids, Ia.
Chicago Roller Skate Co., Ware Brothers Division, Chicago.
Climax Engineering Co., Clinton, Ia.
Cracker Jack Co., Chicago.
Curtiss-Wright Corp., Propeller Division, Caldwell-Clifton, N. J.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Eaton Engravers Machinery Corp., Sag Harbor, Long Island, N. Y.
Firth Sterling Steel Co., McKeesport, Pa.
General Electric Co., Lynn River Works, Everett Supercharger Department, Everett, Mass.
General Motors Corp., Buick Motor Division, Flint Plant, Flint, Mich.
General Motors Corp., Buick Motor Division, Melrose Park Plant, Melrose Park, Ill.
General Motors Corp., Chevrolet Motor Division, Chevrolet Motor & Axle Tonowanda, N. Y.
General Motors Corp., Chevrolet Motor Division, Plant 1, Tonowanda, N. Y.
General Motors Corp., Chevrolet Motor Division, Plant 2, Buffalo, N. Y.
General Motors Corp., Delco-Remy Division, Anderson, Ind.
Gillette Machine & Tool Co., Hollywood, Cal.
Goodman Mfg. Co., Chicago.
Gossett Mills, LadLassie Plant, Anderson, S. C.
Gossett Mills, Pendleton Plant, Pendleton, S. C.
Gossett Mills, Riverside Plant, Anderson, S. C.
Gossett Mills, Toxaway Plant, Anderson, S. C.
M & R Dietetic Laboratory, Inc., Columbus, Ohio.
McQuay Norris Mfg. Co., St. Louis Ordnance Plant, Forest Park Core Division, St. Louis.
McQuay Norris Mfg. Co., St. Louis Ordnance Plant, Siemers Lane Core Division, St. Louis.
Northwest Metal Products, Inc., Kent, Wash.
Ohio Ferro-Alloys Corp., Philo, Ohio.
Parke, Davis & Co., The Bay Division, Bridgeport, Conn.
Parke, Davis & Co., The Bay Division, Versailles, Conn.

MARCH PIG IRON production as reported by 99.8 per cent of the total blast furnaces amounted to 5,247,792 net tons of pig iron and 66,409 net tons of ferromanganese and spiegeleisen, according to the American Iron and Steel Institute, compared with 5,136,543 tons of pig iron and 57,702 tons of ferroalloys in January, the previous 31-day month. Last year, March pig iron production totaled 4,989,932 tons with ferroalloy production amounting to 65,966 tons. For the first three months of 1943, a total of 15,290,952 tons were smelted, while for the same period last year, total production added up to 14,527,626 net tons.

Blast Furnace Capacity and Production—Net Tons

	PRODUCTION						
	Pig Iron		Ferro Manganese and Spiegel		Total		
	March	Year to Date	March	Year to Date	March	Year to Date	Percent of Capacity March
DISTRIBUTION BY DISTRICTS:							
Eastern	963,651	2,801,293	25,666	60,978	989,317	2,862,271	90.5
Pittsburgh-Youngstown	2,215,100	6,319,441	21,407	59,921	2,236,507	6,379,362	102.3
Cleveland-Detroit	524,229	1,509,352	.....	.....	524,229	1,509,352	100.7
Chicago	1,109,799	3,230,402	.....	.....	1,109,799	3,230,402	99.9
Southern	351,435	1,023,163	19,336	59,104	370,771	1,082,267	98.6
Western	83,578	227,298	.....	.....	83,578	227,298	86.7
Total	5,247,792	15,110,949	66,409	180,003	5,314,201	15,290,952	98.7





"24 hours a day, 7 days a week"

"Have been cutting 3″ sq. to 10″ sq. slugs to lengths of from 3″ to 15 inches, 24 hours a day, 7 days a week for the past 4 years and have been doing a very good job," reports this eastern forge company.

Faster-cutting than any other hack saws, these MARVEL 9A and 6A "Automatic" Saws are built for continuous heavy duty operation, with all moving parts operating on ball-bearings and with automatic bar push up, they require no more operating attention than an automatic screw machine.

The complete MARVEL line provides efficient metal-cutting saws that are exactly suited to the needs of every shop.

ARMSTRONG-BLUM MANUFACTURING CO.

"The Hack Saw People"

Eastern Warehouse and Sales: 225 Lafayette St., New York, N. Y.

5700 Bloomingdale Ave. Chicago, U.S.A.

MARVEL SAWS

NON-FERROUS METALS

. . . Market Activities and Prices

Objectives of New Copper Scrap Drive Explained

• • • **The Industrial Salvage Division** has launched its copper, brass and bronze scrap program to apply to all industrial plants. The objective of this program is to recover all possible copper, brass and bronze which the owner considers as non-essential or reasonably replaceable. This includes both production and particularly dormant scrap from all industrial plants and properties covered by Industrial Salvage.

The Salvage Units of the Industrial Salvage Branch will employ all available facilities and media to secure direct action in the following industries which are subject to the present salvage program: Railroads, public utilities, petroleum, mining, chemical, motor transportation, federal agencies, Army and Navy and shipyards.

The Copper Division of WPB has broken down copper, brass and bronze scrap into three main categories: No. 1, No. 2, and other; refinery brass, and copper-bearing material. The first group is used as a substitute for virgin copper. The other two groups are not used in their existing form but it has been definitely established that an unused capacity for producing 19,125 net tons per month of copper from this particular scrap is available. This is considerably above the amount of this type of scrap being collected at present. Additional scrap is the only material obtainable to fill up this idle capacity, as 1942 scrap quantities, domestic mine output, and foreign metal and ores have been taken into consideration.

On this assumption, it has been determined that in 1943, approximately 625,000 tons of refinery brass and copper-bearing material will be needed to produce 250,000 net tons more copper from this source of scrap than was obtained last year. Such an increase can only be obtained, according to the Salvage Division, by increasing the flow from existing sources and by generating and expediting from new sources.

Brass Mill Scrap Redefined

• • • **In order** for the Copper Recovery Corp. to receive the most favorable scrap prices for unused brass mill products acquired from holders of idle or frozen inventories, the OPA has redefined brass mill scrap in amendment No. 7 to revised price schedule No. 12, effective April 21. The definition is broadened to include all sales of unused sheet, tube, rod and other brass mill products by Copper Recovery Corp., Metals Reserve Co. or their agents, if such material was originally acquired by these corporations in their operations under the WPB's copper and copper alloy salvage programs.

Previously, brass mill scrap was defined to include these materials only when sold to a brass mill for remelting.

Zinc Die-Castings Standardization

• • • **Action was recently** taken to advance to the status of a "full A.S.T.M. Standard" the tentative specifications for zinc-base die-castings, the Conservation Division announced April 15.

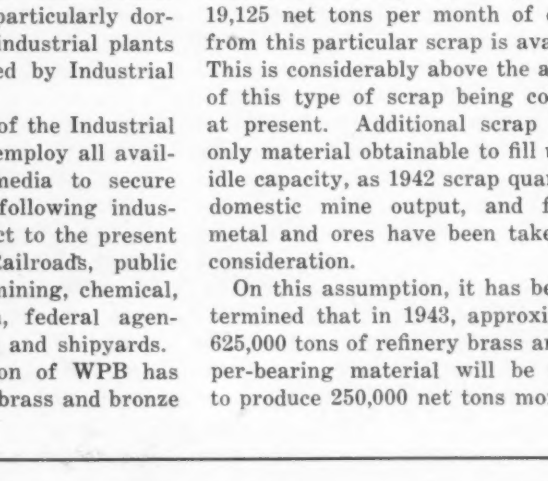
"The provisions of these specifications are based on knowledge of the limits of composition. Deviations from the impurity limits, especially in the case of lead and tin, may prove to be disastrous."

Exclusion of harmful impurities is stressed in the proposed standard. Restriction against lead and tin contamination is of particular significance.

Maintenance of the specified purity requires the use of special high grade zinc and aluminum and copper and magnesium of adequate purity. For military use where zinc die castings are specified, these high grade metals are demanded by government specifications and are available; for non-military uses, however, there is the same pressure in the die-casting field as elsewhere to find substitutes for scarce materials.

Secondary aluminum can successfully be employed if it is free from objectionable impurities, experience

How many BENDS in a Spring?



Here's a subject that deserves close attention and investigation. It's a fact, sad but true, that many springs are unnecessarily intricate, difficult and expensive to make, all because of lack of understanding of the ultimate purpose. Ofttimes, a simplified design — or a different type of material can do wonders in the way of reducing costs and "upping" performance. Here's where experience in spring design pays off. Let the springmaker in on your requirements — in the early stages if possible.

A good spring in time saves nine!

DUNBAR SPRINGMAKERS

SPRINGS WIRE FORMS SMALL STAMPINGS

DUNBAR BROS. CO., Bristol, Conn.

Division of Associated Spring Corporation

has shown that only scrap which has been melted down, cast into pigs and analyzed can be safely used.

Lead is a common substitute for zinc in die-castings for certain specific purposes. It is not possible, however, to produce both zinc and lead die-castings in the same plant without danger of contamination, as only ⅛ oz. of lead can contaminate 100 lb. of zinc.

Playing a major role in today's production of war material, zinc-base die-castings are used in shell, bomb and hand grenade fuses, gas mask fittings, and in carburetor and fuel pump parts for tanks and trucks.

Defraud Charged

Cleveland

• • • **National Bronze & Aluminum** Co., Cleveland, this week was charged with defrauding the government, selling defective war materials and attempting to conceal material that was not in accordance with Army-Navy specifications. The company, producers of aluminum aircraft castings, and some of the executive personnel were brought before federal court on evidence accumulated by the Federal Bureau of Investigation on these charges. This company recently settled a stockholders suit with the election of its present staff of executives. FBI investigations were in progress at that time, and the company charged that part of the declination in production was the result of FBI interference which frightened and demoralized employees to the extent that it interfered with production.

In the meantime, another civil suit, by George Yellen was filed in Chicago as an "informer" suit for $2,000,000. Yellen is also reported to have filed a similar action against Carnegie-Illinois Steel Corp., when the Truman Committee revealed that the company had sold inferior plates.

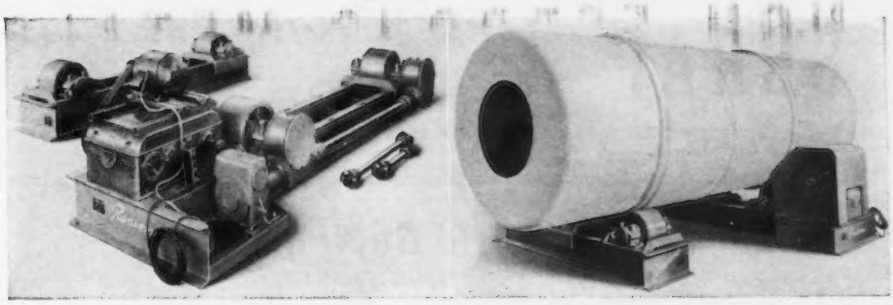
Non-Ferrous Prices

(Cents per lb.)

Copper Electrolytic, Conn. Valley	12.00
Copper Electrolytic, New York	11.75
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, Virgin 99+%, delivered	15.00
Nickel, Electrolytic, base refinery	35.00
Magnesium, 99.8% ingot, per lb.	22.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, No. 12 remelt, 14.50c.; No. 2, standard, 14.50c. a lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 12.25c. a lb.



For Your Position-Welding Problem

. . . RANSOME HAS THE ANSWER

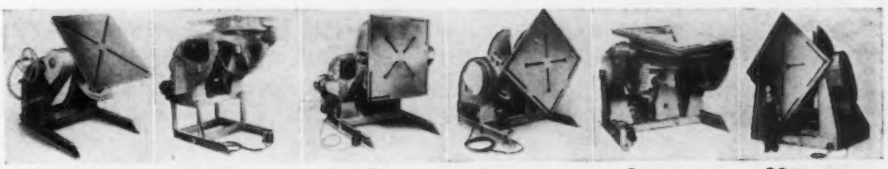
The latest Ransome development in position-welding equipment is shown above . . . Turning Rolls for rotating heavy cylindrical work.

The set of driving rolls is controlled by a variable-speed unit. Means for adjustment to accommodate cylinders from 2-ft. to 14-ft. diameter is provided. One or more sets of idler rolls are used, according to the length of cylinder being worked.

The Ransome line of positioners and rotating fixtures includes the unit that will help you produce smoother and stronger welds . . . in less time than with old methods, and at a substantial reduction in cost.

Our engineers are ready to study your problem and to offer a specific solution.

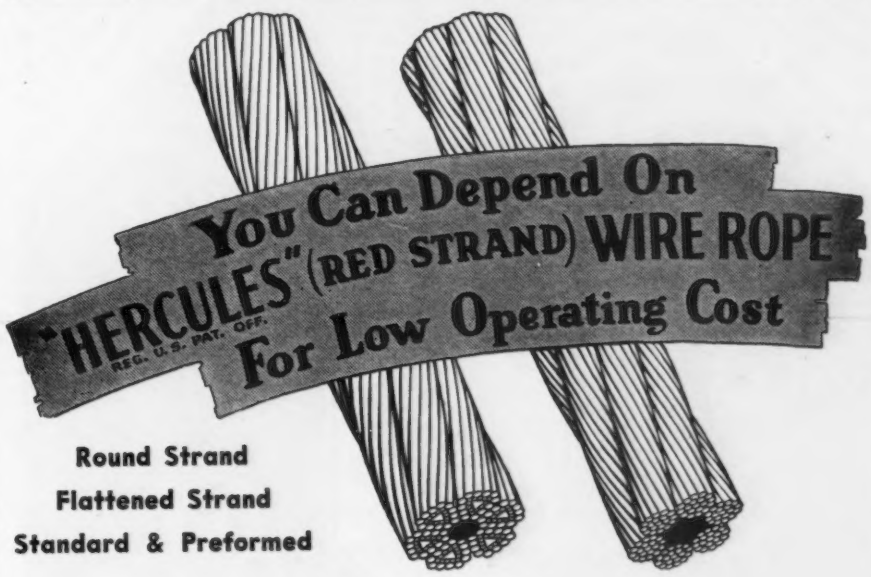
» *Literature on Request*



Light-duty, hand-operated | 2500-lb. cap., elevating base | 3000-lb. cap. | 3-ton cap. | 8-ton cap. | 20-ton cap.

Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY



Round Strand
Flattened Strand
Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** *Established 1857*

5909 Kennerly Avenue, St. Louis, Mo.

New York • Chicago • Denver • San Francisco • Seattle • Portland

SCRAP

. . . Market Activities and Prices

Market Spotty; Little Buying Interest

• • • **The scrap trade** last week reported very spotty conditions generally with little material movement on a profitable scale in any vicinity and with most collections not coming in as well as hoped for. Most farm collections to date have shown rather poor tonnages and the auto graveyards while producing fairly well seem doomed as an important source of real tonnage. Industrial scrap has been plentiful with turnings still making up the bulk. Ship yard scrap has been about as usual although plate scrap is falling off slightly due to reductions in certain munition programs such as tanks. St. Louis is again on record as suffering from labor shortages and a dearth of good quality scrap. Poor yard operations there threaten to close some yards while the mills are seriously needing heavy melting grades.

War Materials, Inc., former scrap salvaging agency for the Metals Reserve Co., gave up the ghost last week and rendered its spirit and contracts to the Steel Recovery Corp. which will pursue its program to some extent. WMI's Pittsburgh offices closed for good April 15.

Some Aid Seen in Scrapyard Wage Decision

Detroit

• • • **Pay raises for scrapyard** workers in Detroit were authorized by the Michigan Regional War Labor Board office, effective in the first pay period after May 1, shortly before orders were issued from Washington freezing wage levels.

There were some questions whether the raises were mandatory or permissive, hence there was some small doubt whether they would become effective in all yards at once. Maximum rates for crane men were set at $1.15 to $1.25 an hour; for common labor a maximum of 80c.; for shear men 90c. and for truck drivers, $1.00. Slightly lower hiring rates were set up which automatically moved to higher levels after 60 days of employment.

•

Scrap Markets

PITTSBURGH — While the warmer weather has acted to increase the flow of scrap into consumption all mills in this area are by no means safely situated. Some have inventories equal to only two weeks' supplies and none are able to take steps to rebuild piles depleted during the winter. The turnings situation here is not as serious as in other areas.

•

BUFFALO—Talk of new scrap drives left some Buffalo district operators cold this week. "We dealers don't understand why there should be more scrap campaigns when WPB hasn't solved the turnings problem," one of the bigger proprietors said. He argued that turnings provided much better scrap material than the stuff obtained in junk drives. Meanwhile, turnings continue to pile up or lay around here because area consumers won't take them.

•

BOSTON—Movement of scrap has declined rather than increased. Contributing to the setback is the falling off in buying of turnings by mills heretofore fairly good consumers. Sales of turnings are now "here and there," and include equal parts of heavy scrap. Then, too, mills are refusing to do business in any kind of scrap which involves the Boston freight rate.

•

BIRMINGHAM — Demand for cast grades, occasioned by reduced inventories, is showing a slight increase in this area. With about 60 days supply on the yards, steel mills are confining purchases of steel scrap to amounts sufficient to keep inventories from decreasing.

•

CINCINNATI — District dealers indicate that adherence to price ceilings is very strong in this territory and no below ceiling transactions have been reported. While the present supply of scrap is reported adequate for current needs, dealers continue to anticipate a severe shortage in the next two or three months.

•

ST. LOUIS—Labor shortage, due to competition and service inductions, plus lack of sufficient scrap to profitably work, are threatening to cause suspension of operations at certain commercial yards in the general area. Some yards are losing heavily, and are unable to recoup their losses from brokerage and other sources. Current receipts are large, but poor in quality. There is an almost acute lack of No. 2 heavy melting steel.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
							Low Phos.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

* Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the crresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their planes. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

. . . Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Apr. 20, 1943	Apr. 13, 1943	Mar. 23, 1943	Apr. 21, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Apr. 20, 1943	Apr. 13, 1943	Mar. 23, 1943	Apr. 21, 1942
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.50	$6.00
Foundry coke, prompt	7.375	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 129 to 132.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Apr. 20, 1943	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	23.61	23.61	19.17	19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. ~~12~~	~~6.43~~, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

CHECK your use of forgings against these seven advantages that forgings offer

These 19 manufacturers obtain specific benefits from forgings

Manufacturer of	Uses Forgings for	Saving of Metal Effected	Reduction in Machining Time	Other Advantages Realized
Material Handling Equipment	Over 70 Parts	Yes	Yes	Fewer Rejects
Diesels	Flange	Yes	Yes	Welding Eliminate
Wire Strapper	Arms	50%	100%	No Machining
Elevating Truck	Sprocket	18 lbs.	Approx. 40%	Less Time
Pressure Valves . . .	Body	Yes	24%	Less Scrap
Collapsing Tap	Six parts	Yes	Approx. 10%	Less Scrap
Oil Valves	Body	Yes	Approx. 50%	Fewer Rejects
Chain Pullers	Well End	No	Approx. 20%	Inspection Time
Oil Equipment	Valve Body	No	Approx. 75%	Fewer Rejects
Motor Graders	Clutch Parts	No	Approx. 15%	Less Wear on Too
Axle Housings	Shift Lug	Yes	Approx. 750%	Saving Mach. Spa
Turret Lathes	25 Parts	Yes	Approx. 20%	Fewer Rejects
Automatic Lathes . .	Gears	Yes	Approx. 80%	Less Scrap
Automatic Hoists . . .	Drum Sleeve	6600 lbs.	1200 man-hrs.	Fewer Rejects
Typesetting Machines	Vise Jaws	Yes	Approx. 35%	Less Time
Gears	Spiral Gear	19 lbs.	Approx. 20%	Less Time
Milling Machines . . .	Bevel Gears	Yes	Approx. 30%	Insp. Time Saved
Gear Sets	Pinion	App. 50 lbs.	Approx. 75%	Less Scrap
Industrial Trucks . . .	Diff. Case	Yes	Approx. 25%	Fewer Rejects

Evidence substantiating these advantages has been published in Drop Forging Topics.

The 7 advantages that forgings offer

1. **Forgings Conserve Metal:** Strength is a primary quality advantage of forgings. The metal bulk of many parts may be reduced because maximum tensile and torsional strength is obtainable in forgings through controlled grain flow and distribution of metal.

2. **Forgings Lessen Scrap:** In forgings it is possible to obtain uniformity of physical properties in the exact degree desired. Practically no rejections result. Heat treating forgings is a straight-forward production procedure, controllable at all times.

3. **Forgings Conserve Metal by Weight Reduction of Parts:** Reduction of dead weight is a common result of using forged parts because forging produces maximum strength in lighter sectional thicknesses, thereby permitting the use of lighter weight parts.

4. **Forgings Facilitate Rapid Assembly Through Welding Adaptability:** Forgings provide a welding adaptability of widest range for fabricating complicated parts from two or more forgings.

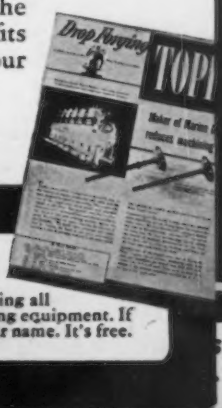
5. **Forgings Require Less Time to Machine and Finish:** Forgings are shaped in closed dies and require a minimum of machining or finishing because there is no bulk of excess metal to remove, and freedom from concealed defects avoids loss from rejections.

6. **Forgings Reduce Accidents to Men and Machines:** Freedom from concealed defects is an outstanding characteristic of forgings that underlies the greater margin of safety that forgings afford for men, machines and material.

7. **Forgings Can Take It:** By the forging process, stamina is achieved through concentration of grain structure and fiber formation at points of greatest shock and strain. Forgings provide high fatigue resistance which underlies dependable performance, and continuous operation over longer periods of use.

★ ★ ★ ★ ★

THE EXPERIENCE of 19 manufacturers who checked their use of forgings and identified the benefits obtained through forgings, suggests that a recheck of every forging part you use against the seven advantages that forgings offer, might reveal further opportunities to conserve critical materials, or indicate a faster method for machining and finishing forgings, or effect a reduction of scrap . . . Everyone in your plant who is responsible for designing, obtaining and finishing forgings should check your use of forgings against the seven advantages forgings offer. This checking need not be difficult or time wasting. Assistance is available from forging engineers connected with your source of supply. These men are well qualified by broad experience to help you obtain the fullest measure of benefits from forgings. Begin your checkup now!



ROP FORGING ASSOCIATION

5 Hanna Building • Cleveland, Ohio

Drop Forging Topics contains technical information for design engineers, production executives, metallurgists and other technicians who are devoting all their effort to speeding up the production of fighting equipment. If you do not receive "Topics" regularly, send us your name. It's free.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars [10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes [2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ [12]			3.39¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel [6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ [13]	2.27¢	2.40¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ [13]	2.27¢		2.49¢
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)						2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
								(Coatesville and Claymont = 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ [11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE [9]															
Bright [14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.